

THE IRON AGE

THURSDAY, OCTOBER 5, 1893.

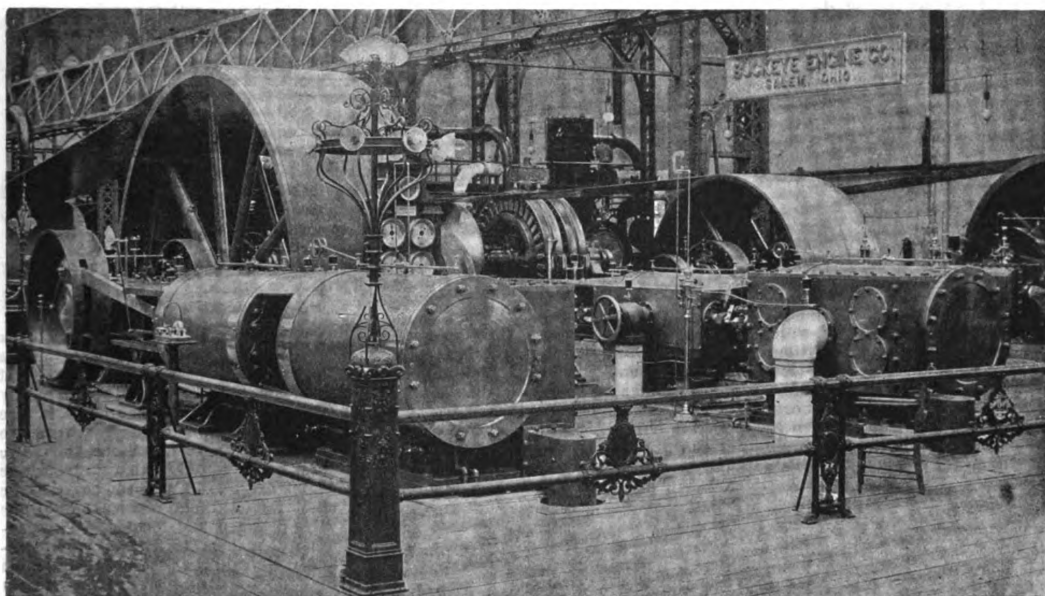
The Buckeye Triple Expansion Four Cylinder Engine.

The triple expansion four cylinder engine built by the Buckeye Engine Company of Salem, Ohio, now at the World's Fair, has attracted great attention because of its admirable design, its careful workmanship, and particularly because of its excellent performance. Since the time steam was first admitted the engine has run without betraying any defect whatever. The engine embodies all the essential features which have been developed by the long experience of the Buckeye Company, and which have proved to be best adapted

to the steam chests; Fig. 9 shows all the principal details of the eccentrics; Fig. 10 represents in perspective the assistant valve mover and also the method of transferring the automatic motion of the cut off valve of the first cylinder to that of the others in line without duplicating the gear; Fig. 11 shows the governor, and Figs. 12 to 15 are indicator cards from each cylinder.

The cylinders are arranged in pairs, as shown in the plan view, the high pressure and a low pressure cylinder being upon one side and the intermediate and another low pressure on the other side. The high pressure cylinder is 20 inches in diameter, intermediate 32½ inches, the two low pressure 36 inches, the common stroke being 48 inches. The

construction with this company and one of great value is found in the valve, which is a balance slide valve provided with a riding cut off valve. It is not to be understood that the main valve is perfectly balanced; it is, as stated by the makers, a "properly" balanced valve or one in which there is only sufficient friction on the surfaces to keep them bright and to prevent corrosion from the starting leakage, which would afterward be increased by the cutting action of the steam. These flat wearing surfaces have been found to keep perfectly steam tight after many years of service, and although it is not claimed that true plane surfaces will always be maintained, it is justly stated that the fit will always be steam tight. Both the



THE BUCKEYE TRIPLE EXPANSION FOUR CYLINDER ENGINE.

to continuous service and severe duty. It has also some new features of special interest. The Buckeye people were the first to appreciate the advantages to be derived from the use of a shaft governor, and among the early pioneers in the employment of multiple cylinder engines, and in the use of a balanced slide valve with a riding cut off, and also in the adoption of a two ported instead of a four ported cylinder, the usual practice in so-called Cortiss engines.

The principal features of this engine are clearly brought out in the accompanying engravings, Fig. 1 being from a photographic reproduction of the exhibit at the World's Fair, Fig. 2 being a plan view showing the general arrangement of the engine and the receivers and piping; Fig. 3 a side elevation showing the foundation and method of bolting; Fig. 4 a cross section through cylinders and piping; Fig. 5 a section through the intermediate and low pressure cylinders and their valves; Figs. 6 and 7 details of one of the pistons; Fig. 8 sections through one of

extreme length of the engine from the center of the shaft is 31 feet 11½ inches, and from the center of the shaft to the center of the high and intermediate cylinders 18 feet 3 inches. The shaft is 14½ inches in diameter at the center, 13 inches in the bearings; the fly wheel is 20 feet in diameter, 75 inches in width, and weighs 45,000 pounds. The frame is of the girder type—that is, one which has an I-beam cross section. The piping and reheaters are all placed underneath the floor, which is a neat arrangement as compared with other engines, where these unsightly parts are in full view, thus marring an otherwise pleasing design.

In Fig. 5, which is a sectional plan through the intermediate and its low pressure cylinder and their valves and steam chests, are clearly brought out the construction of these parts and also the connections of the valves with the eccentric rods. The intermediate and low pressure cylinders are steam jacketed in the heads; otherwise the cylinders are without jackets. An original

main and the cut off valves have a positive movement of uniform extent on their seats, thereby doing away with the disadvantage arising when a valve closes its port by a small and variable amount of lappage and remains stationary during the rest of the stroke of the pistons. A valve of the latter description permits the surfaces to wear untrue because of lack of sufficient travel, and also permits the steam to cut channels across the portions thus left exposed.

Steam is admitted to the steam chest at *a*, whence it passes in the directions indicated by the arrows, through the balance pistons *b* to the interior of the main valve, in which boiler pressure is constantly maintained when the engine is at work. These balance pistons are suitably packed with metal rings and followers and are fitted to work steam tight on the faces of the cover plates of the main valve *c*. From the interior of the valve the steam is admitted to the cylinder through the ports shown. The cut off valve, which works within the main valve and is driven by a rod pass-

ing through the main valve rod, is formed of two plates rigidly connected by rods. These plates work on seats

area of the balance pistons is constant and consequently in excess except during induction. This excess is counter-

ure of contact is reduced to about what is needed to insure wear enough to keep the surfaces in good condition and at

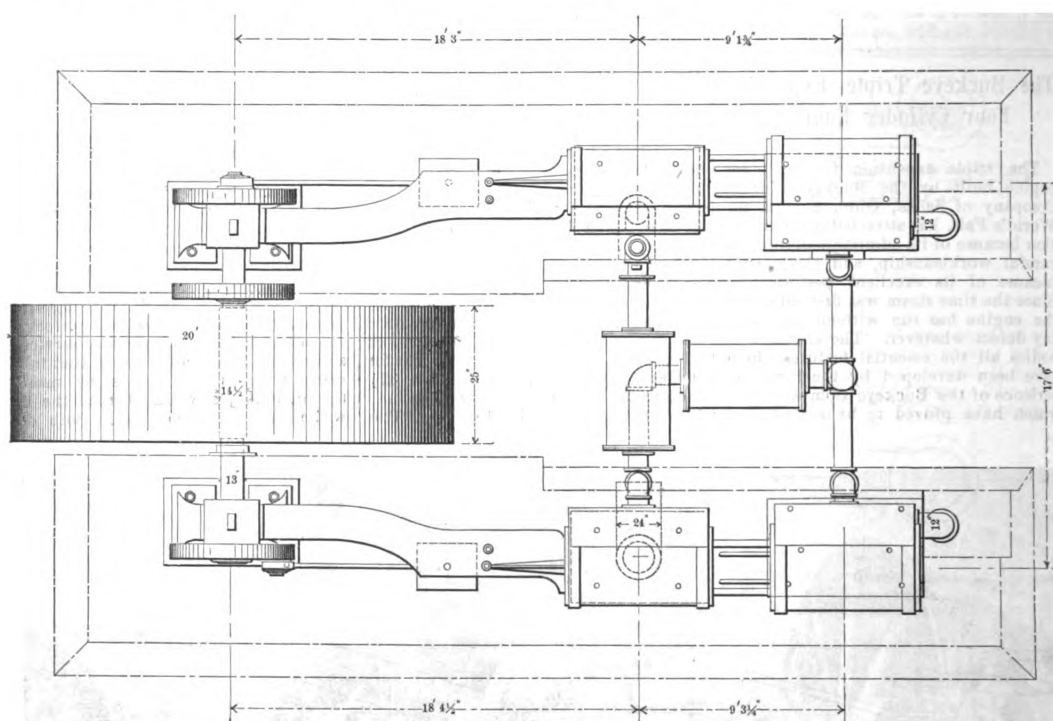


Fig. 2.—Plan.

surrounding the valve ports, which they alternately cover at proper times relatively to the piston travel, this being determined by the action of the governor. The area of the balance pistons is such as to hold the valve to its seat against the force tending to throw it off, due to the pressure in the valve and

acted by means of shallow recesses corresponding to the cylinder ports in shape and area, and which are formed in the valve seats near their inner margins. These relief chambers, as they are termed, are filled with steam pressure from the interior of the valve through small holes, while the port at

the same time provide for better lubrication. Channels are cut across the valve faces near its ports to prevent the steam in the ports from acting on any larger area than is embraced in the balance pistons, and thereby throw the valve from its seat. Since the valve chest contains only exhaust steam, the engine can be run with the cover of the chest removed, and any leakage of the valve detected and located. This permits the makers to fit the valve perfectly tight in the first instance, which they do by fitting the valves to their seats at the shop under working steam pressure, and repeatedly scraping the valve surfaces until all leakage disappears. This is an exceedingly im-

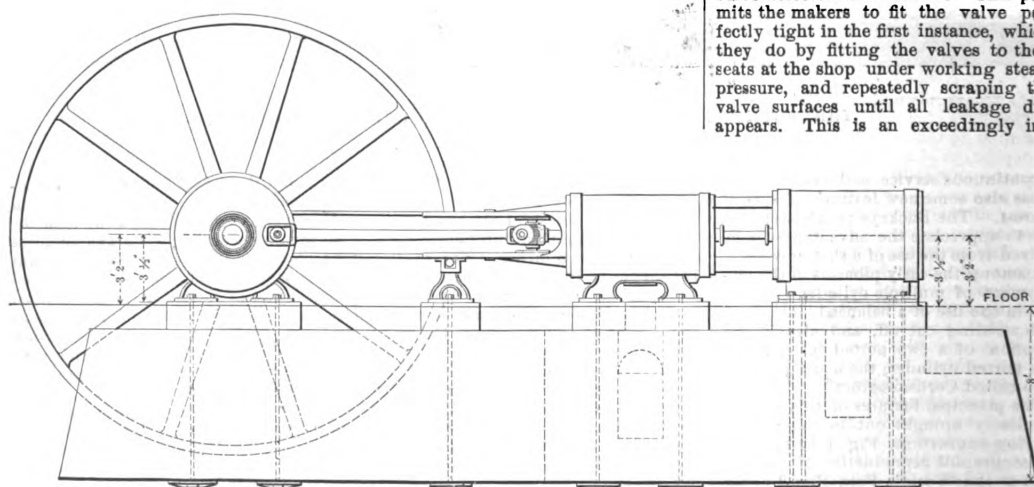


Fig. 3.—Side Elevation.

THE BUCKEYE TRIPLE EXPANSION FOUR CYLINDER ENGINE.

cylinder ports. This tendency is variable, being greater at the moment of induction and decreasing after cut off, while the counteracting force due to the

the same end is open for exhaust and relieved of such pressure by the movement of the valve a little before induction. By this device the average press-

portant feature, because it not only admits of proper workmanship before the engine is placed upon the market, but it also permits of easy and perfect in-

spection at any time during the life of the engine.

The details of the eccentrics are very clearly and fully brought out in Fig. 9. The wearing surfaces of the eccentrics and straps are spherical in form; that is, they are a central section of a perfect sphere of a size corresponding to

ference is slight in the Buckeye valve gear, yet it does exist. This friction tends to aid the springs to overcome the centrifugal effect of the governor weights, and in fact this force is not constant.

This fact led to the application of the "auxiliary springs," which entirely

under heavy steam pressure. Engineers operating large compound engines will appreciate this feature.

The valves on the intermediate and low pressure cylinders are of the usual Buckeye flat construction, this construction being maintained in order to keep the clearance spaces of those cyl-

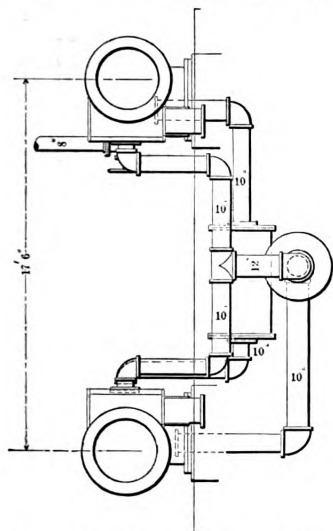


Fig. 4.—Sectional Elevation Fig. 2, Showing Piping.

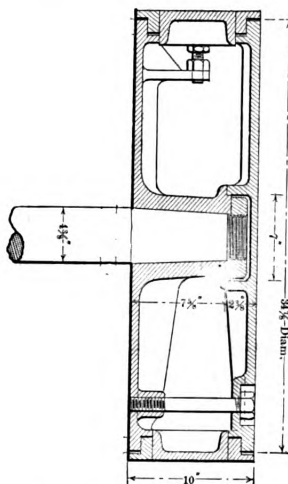


Fig. 6.—Section of one Piston.

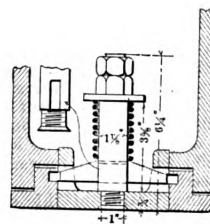


Fig. 7.—Detail of Piston.

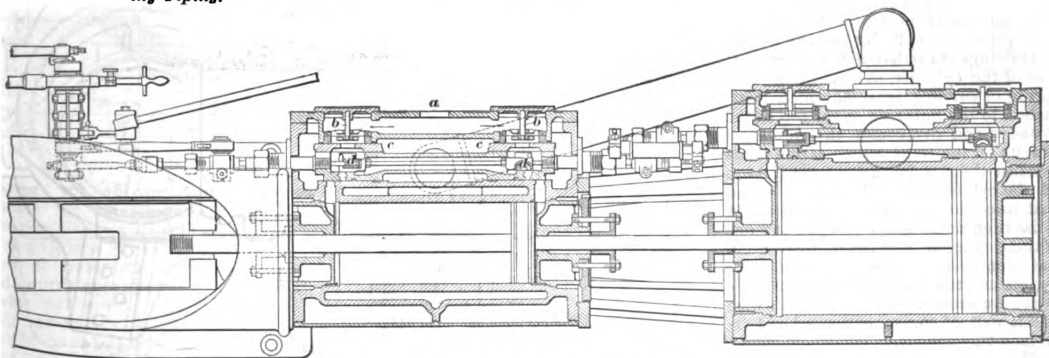


Fig. 5.—Sectional Plan through One Pair of Cylinders and Valves.

THE BUCKEYE TRIPLE EXPANSION FOUR CYLINDER ENGINE.

the exact diameter of the eccentric. Therefore their operation is precisely similar to that of a ball joint and is independent of perfect alignment of the connecting rods. The benefits of this improvement over the old form in the way of easy, cool and quiet running are evident.

The governor claims superiority because of its sensitiveness, certainty of action, and particularly because of its safety from accidental detachment.

Fig. 11 is a perspective view of the governor as at present constructed. It will be seen that the eccentric, which is operated by the governor and which in turn operates the cut off valve, is loosely fitted to the shaft and is adjusted concentric thereto by the centrifugal action of the governor. This fact, combined with the ingenious arrangement of the compound rocker arm, is what leads to the constant extent of travel of the cut off valve on its seat in the main valve.

The theoretical action of any governor is somewhat interfered with by the friction of parts operated by the governor eccentric. While this inter-

ference is slight in the Buckeye valve gear, yet it does exist. This friction tends to aid the springs to overcome the centrifugal effect of the governor weights, and in fact this force is not constant.

Up to this point we have referred only to features which have been in long and successful use by the Buckeye Company. We now call attention to details of interest on this engine which are of recent application.

The makers state that this engine was designed to be used with unusually high boiler pressure (say 160 to 180 pounds). To meet this condition most successfully they have employed piston valves, both main and cut off, on the high pressure cylinder only, where the range of pressures is greatest. This arrangement may be said to be somewhat in line with recent marine practice. It eases the work on the valve gear, but especially enables the engine to be worked more conveniently by hand

inders down to the lowest point usual in engines of this make. The actual clearance spaces are 2.8 per cent. in the high pressure cylinder and 2 per cent. in all the other cylinders.

A unique feature adopted by this company in all tandem construction is the method of transferring the automatic motion of the cut off valve of the first cylinder to that of the other cylinders in line, without duplication of valve gear. This is illustrated by Fig. 10, which also shows another novel feature—namely, an "assistant valve mover" to aid the eccentric in operating the main valves. It should be stated that this illustration was not taken from the exposition engine, but from another engine of similar size. It serves, however, to bring out the points to which we desire to call attention.

On the exposition engine this cylinder is 4½ inches diameter by 5½ inches stroke and has a constant cut off of one-fourth the stroke. On all large tandem constructions operating under high pressures, or at high velocities, or both, whether horizontal or vertical engines

and of whatever style of construction, considerable inertia must be overcome in starting the main valves and all their operating and connecting parts in motion at the beginning of each stroke. This imposes a severe duty on the eccentric. Add to this inertia the friction due to steam pressure and the argument for the assistant cylinder becomes evident, especially in the case of engines having unbalanced valves.

The operation of the assistant valve mover will be understood from an inspection of Fig. 10. Its piston rod is connected to the valve gear, as shown, and the movement of its piston is such as to aid the eccentrics to throw the valves at each stroke.

This feature was originally brought out in marine service, but owing to the rapid increase in sizes of stationary engines and in the steam pressure used, as well as to the large sizes of cylinders and valves which are being applied to compound, triple and quadruple expansion engines, steam actuation or partial steam actuation—which is here accomplished—seems a step forward in steam engineering.

Another feature of this engine derived from marine practice is the application of steel pistons to the large cylinders. They are made from steel to decrease the weight of reciprocating parts without reducing strength. Fig. 6 is a sectional view of one of these pistons. The packing rings, Fig. 7, only are of cast iron and are of L shape, so formed to enable one-half the surface to be acted on by steam pressure. The rings are split near the bottom and sprung into the cylinder and the weight of the rings is carried not on the bottom of the cylinder, as usual, but by a spring of suitable tension, which is attached to the bull ring at the top of the cylinder and overcomes the action of gravity on the rings, which action tends to cause them to fall away from the top of the cylinder. It should be stated that since the opening of the exposition it has been unnecessary to open any one of these cylinders, and not the least sound has been heard from any of them. We understand that the engine is soon to be tested for economy by experts, in which case it will, of course, be opened and examined throughout.

The steam pressure under which the engine is working at the exposition is 125 pounds initial, and the number of revolutions 89. This gives a belt velocity of about 5600 feet per minute. The engine is equipped with reheating receivers, both between the high and intermediate and between the intermediate and low pressure cylinders.

We present herewith a set of indicator cards taken from each cylinder of the engine simultaneously, while working with about the load which the engine has carried between 6 and 11 o'clock p.m. since the beginning of the exposition. These cards figure up a total of 710 horse-power. This load is not great enough to suit the adjustments of the engine, which was built for a much greater load, hence the small loops at the ends of the high pressure and intermediate cards.

While the Buckeye Engine Company have never advocated exceedingly high speeds, they have recognized the fact that rapid piston speeds within certain limits are desirable. They have, therefore, in their engines adopted that speed which seemed to them to be best adapted not only to the work to be performed by the engine, but also the best adapted to the engine itself, in order that its work may be done to the best advantage. They have made all parts of the engine of unusual weight and

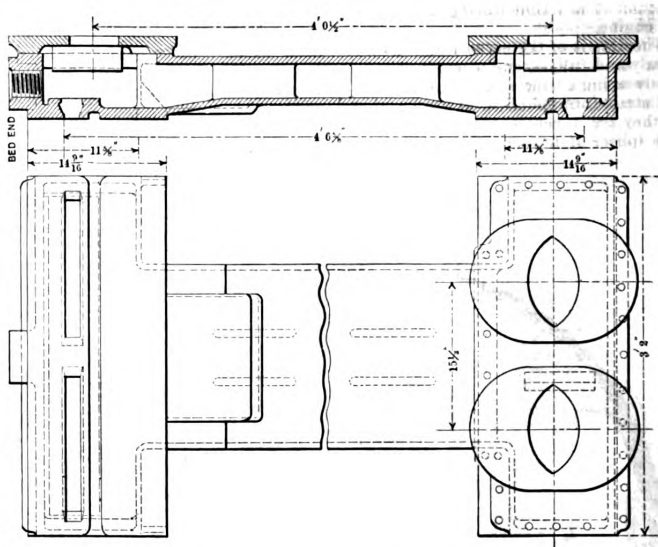


Fig. 8.—Section through Steam Chest.

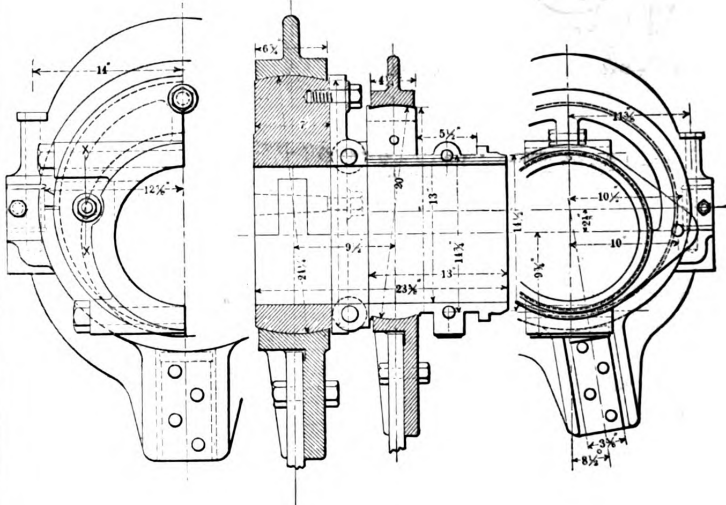


Fig. 9.—Details of Eccentrics.

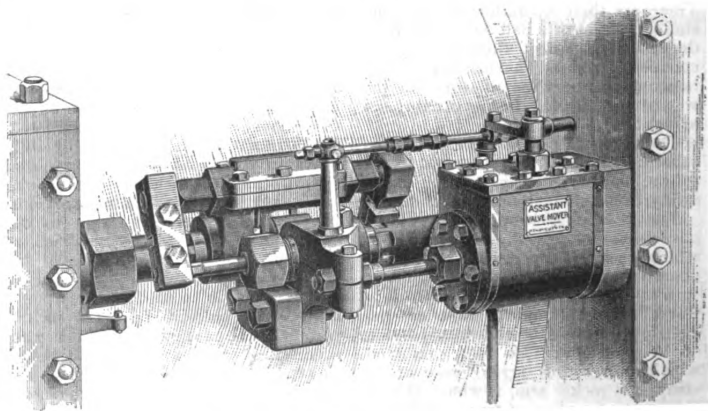


Fig. 10.—Assistant Valve Mover.

THE BUCKEYE TRIPLE EXPANSION FOUR CYLINDER ENGINE.

strength. The wearing surfaces in each case are of ample size and provision is made for the easy taking up of all wear. Taken as a whole, the design is extremely simple, and at the same time such as to insure great durability. We find throughout the engine not only the best selection as to material, but an evidence in every part of workmanship of superior kind.

The Bessemer Process as Conducted in Sweden.—II.*

BY PROF. RICHARD AKERMAN, STOCKHOLM, SWEDEN.

A consequence of the low percentage of silicon in the pig iron is that the boil, or violent ebullition of the carbon, gen-

large as compared with the charge of pig iron, contributes in large measure to this result. This area generally amounts to from 80 to 35 square cm. (4.65 to 5.43 square inches) per ton of pig iron; exceptionally, it may on the one hand reach 50 and on the other hand 15 sq. cm. (7.75 and 2.33 square inches) per ton. That the proportion just now mentioned is so large, depends, however, by no means on an absolutely large total tuyere area, but simply upon the small charges, which in general do not amount to more than 3000 to 3500 kg. (6614 to 7716 pounds) of pig iron. The converters are proportionately small, their diameters being about 1.5 to 1.6 m. (4.92 to 5.25 feet), but at the bottom only 1.2 to 1.3 m. (3.94 to 4.26 feet), while the interior height from the bottom to the mouth usually varies between 2 and 2.5 m. (6.56 and 8.2 feet).

For more than 20 years rotating converters exclusively have been used in Sweden, and for the better preservation of heat they always have the mouth on the side. For the same reason the mouth of the converter is always very narrow, being often only 0.2 to 0.25 m. (8 to 10 inches), but occasionally 0.3 m. (12 inches) in diameter. The total area of the tuyeres amounts generally to 80 or 120 sq. cm. (12.4 and 18.6 square inches), and is most often divided up into from 70 to 200 holes, for the most part 9 to 10 mm. (0.35 to 0.39 inch) but now and then 6 to 15 mm. (0.25 to 0.59 inch) in diameter. The pressure of the air is most frequently between 400 and 1000 mm. (16 and 39 inches) of quicksilver (equal to 7.8 and 19.6 pounds per square inch) and the blowing engines are generally of from 600 to 900 horsepower.

The procedure during the blow depends not only upon the initial temper-

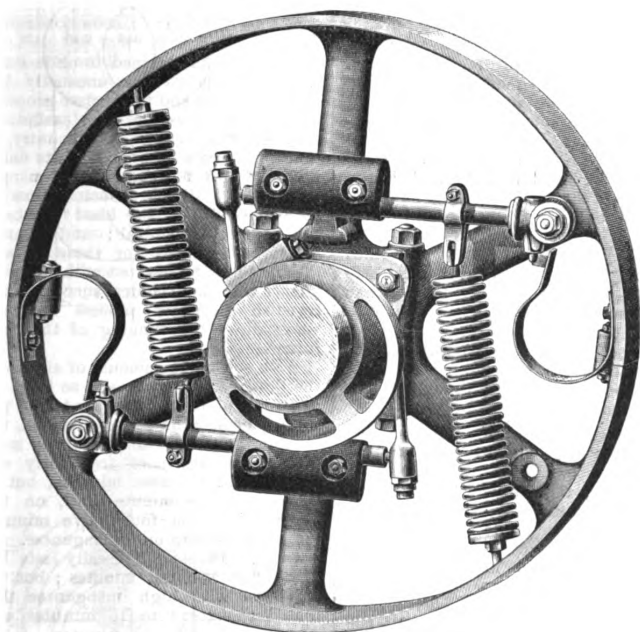
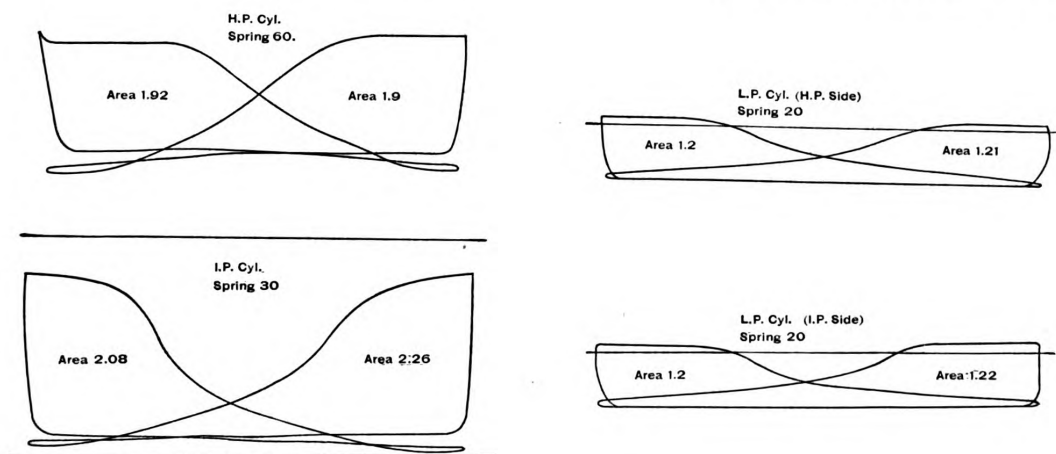


Fig. 11.—The Governor.



Figs. 12 to 15.—Indicator Cards.

THE BUCKEYE TRIPLE EXPANSION FOUR CYLINDER ENGINE.

To the credit of the makers it should be added that the remarkably fine performance of this engine during the period of the exposition up to this time demonstrates fully the value of this construction for large powers. We look forward to the promised expert tests of economic efficiency with much interest.

The Rhode Island Locomotive Works, Providence, R. I., have reduced wages 10 per cent.

erally begins from one and a half to three minutes after the blow has begun, and the ordinary time for the entire blow is not more than seven to ten minutes, not counting the time used in taking samples. The area of the tuyere holes, which in Sweden are very

* Read before the American Institute of Mining Engineers. Translated by Philip W. Moen and Emanuel Trotz, Worcester, Mass. Chicago meeting, being part of the International Engineering Congress, August, 1893.

ature of the pig iron and upon its chemical composition, with which the generation of the heat varies, but also upon the degree of fluidity of the pig; because when the pig iron is viscous the process may be so delayed, through increased resistance to the blast, particularly if the blowing engines are not especially strong, that the boil does not begin until much later than would be the case with a fluid, but in other respects similar, pig iron. Such viscosity

is here often the result of a large percentage of silicon; and to the reasons previously given for a basic blast furnace charge, which gives with the same temperature a smaller amount of silicon, may therefore be added this, that not only the pig iron, but also the Bessemer product made from it, becomes more liquid, a result which is still further promoted by the amount of manganese in the pig iron.

With the exception of silicon, there is no material which has such an influence upon the operation of the Bessemer process as manganese. The opinion that combustion during the Bessemer process is performed exclusively by the blast direct, and consequently without the aid of the slag formed by it, has been all too prevalent. That the percentage of oxidized iron in the slag during the boiling period can be diminished as much as from 34.7 to 21.1 points out in an indisputable manner that the oxidation of the carbon in this case must have been performed in an essential degree by the reduction of oxidized iron from the slag. In this refining the slag has in reality assisted the free oxygen in still greater measure than would generally be noticed at first sight; for besides the fact that the amount of silica in the slag, considered absolutely, has only slightly increased during the interval (so that in place of 48.8 silica with 34.7 ferrous oxide, there is found, 2½ minutes afterward, $21.1 \times 48.8 : 59.8 = 17.2$ per cent. ferrous oxide, instead of the apparent 21.1 per cent. given), it is evident that a material part of the combustion of carbon which has been effected by free oxygen did not in point of fact occur directly, but was brought about by the intervention of slag. For during the boil, as well as at the beginning and end of the process, iron must have been oxidized and subsequently reduced again by carbon, although this action escapes notice, and indeed must do so as still more iron was thus reduced.

That the proportion of oxidized iron does not always diminish during the boil, but may, on the contrary, increase, affords no proof that the slag has been inactive in refining, for the condition alluded to is evidently the result of there having been more iron oxidized during the boil than was reduced out of the slag by the carbon. Without a doubt, even in this case, refining has been assisted partially by the slag.

An interchange must take place in the Bessemer, as in all other refining processes, between oxidizing or oxygen-yielding materials, on the one hand, and reducing or oxygen-taking materials on the other. How far, at any particular moment, more or less iron is oxidized than is simultaneously reduced again by the other elements of the pig iron depends as well on the chemical composition of the metal and slag bath as on the temperature and internal mixture. At any moment during the process there must be a spontaneous tendency toward the state of equilibrium, necessitated by the conditions set forth; and a result of this is that the content of oxidized iron in the slag increases at the beginning, until it thus becomes so oxidizing that as a consequence iron is reduced as fast as it can be oxidized by the oxygen of the blast.

This occurs earlier, or with a lower content of oxidized iron in the slag, the hotter the blow; because the tendency of carbon to take up oxygen increases far more rapidly than that of iron when the temperature rises above

yellow. A given result of this is that the warmer the Bessemer blow the smaller will be the loss of iron by combustion, and the more acid, and, as a consequence, the thicker and tougher will be the slag.

Another condition which aids considerably toward the establishment of the state of equilibrium, even when the amount of oxidized iron in the slag is comparatively low, is a larger portion of manganese in the pig iron; for manganese, besides contributing to the higher temperature, with the resultant lower proportion of iron in the slag, also makes the slag more liquid, so that it mingles more intimately with the mass of iron, and, in consequence, operates more in oxidizing, albeit the content of iron is lower than would be the case with a less liquid slag. It is also an important fact that the oxide of manganese takes to a certain degree the place of that of iron, though not to such an extent that the combined amount of MnO and FeO in the slag must not be considerably greater than if the amount of manganese were less. From this it follows that the blow progresses more slowly, and that the waste increases with the amount of manganese in the pig, though in less than equal ratio.

These conditions bring it to pass that of two pig irons with the same amounts of silicon, but different amounts of manganese, that which contains the most manganese will give the greater quantity of more liquid and less oxidizing slag, which during the boil does not take part in the combustion of carbon as actively as does a smaller quantity of slag which is richer in iron, and the result is, therefore, that when the blow does not progress so rapidly that the rise of temperature during the boil compensates for the falling off in the combustion of carbon due to the decrease in the content of carbon, a Bessemer slag, produced from a pig iron richer in manganese, can, even during the boil, be richer in oxidized iron, in that more iron is oxidized by the oxygen of the blast than can be simultaneously reduced out by carbon.

When the silicon in the pig iron is not higher than 1.14 per cent., almost all the silicon is necessarily removed before the boil, unless the blow be very hot, either because the pig iron contains more manganese than usual for the Bessemer process, or for some other cause, as, for instance, an initial high temperature of the pig iron; but in the last named case the removal of the silicon is delayed by the temperature, and the reason for it is the already oft-repeated fact that when the temperature rises above the melting point of pig iron the tendency of carbon to be oxidized increases more rapidly than that of silicon. With manganese the case is somewhat similar, so long as there is not over 2 per cent. of it in the pig, for the incomparably greater part of the manganese is then removed before the boil. But with higher contents of manganese (4 to 6 per cent.) oxidation of the manganese is more evenly distributed throughout the entire blow. According to information kindly given by J. A. Brinell, the following are the ordinary results at Westanfors, where the blow is always direct, and there is, therefore, no subsequent addition of manganese:

In steel and iron produced from pig iron with 4 per cent. manganese and 1 per cent. of silicon, the carbons in the product are accompanied by the percentages of manganese and silicon shown under them.

Percentages.

Carbon.	Manganese.	Silicon
1.3	0.6	0.06
1.1	0.55	0.05
0.9	0.5	0.045
0.7	0.4	0.045
0.5	0.3	0.04
0.3	0.2	0.03
0.2	0.15	0.02
0.15	0.12	0.015

In Bessemer steel from pig iron with 5 to 6 per cent. of manganese and 1 per cent. of silicon, the corresponding figures are as follows:

Carbon.....	1.3	1.1	0.9	0.7	0.6
Manganese.....	1.25	1.05	0.9	0.7	0.6
Silicon.....	0.25	0.2	0.15	0.12	0.1

Before we had learned to understand the workings of an unusually hot Bessemer blow and to regulate properly the heat in question, such exceptions could occur, even in this country, as that a product was obtained quite unexpectedly with 0.5 carbon, 1.10 manganese and 0.5 silicon. Such anomalies no longer occur if the blast furnace is suitably under control; and for this reason, as well as for those already given, it may be asserted with full confidence that the technical success of the Swedish Bessemer process depends, above all, on the running of the blast furnace.

With so small an amount of silicon in the Bessemer pig iron, and so large an aggregate of tuyere area per ton of pig as is generally the case in Sweden, the refining or slag-forming period must be very short, most frequently one and one-half to three minutes, but at times only one minute, and, on the other hand, from four to five minutes for pig irons with more manganese. As a whole, the blow generally lasts between five and ten minutes; but for pig irons with high manganese that time may extend to 15 minutes and sometimes even to 20 minutes. Since blows are made at ordinary Swedish Bessemer works approximately direct to the desired carbon, it must be evident that the duration of the blow will increase with the degree of softness desired in the product.

As there is but little silicon in the pig iron, and hence the temperature in the converter is relatively low, the slag is only slightly acid, and it may even be somewhat basic. Hence it is considerably more fluid than the converter slags usual in other countries.*

More especially is this the case with the slags derived from the more manganeseiferous pig irons, which, when the charge is poured, are so liquid and so white that one not accustomed to them often cannot tell when the iron ceases and the slag begins to run out of the ladle.

Inasmuch as with the less manganeseiferous pig irons the manganese practically passes entirely into the slag, it follows that about 0.8 per cent. of manganese in the pig iron will suffice to render the protoxide of manganese the prevailing base of the slag, until such time as the carbon of the bath is so lowered that the latter consists of soft steel; and since, moreover, the Swedish Bessemer slag generally remains about a bisilicate it is easy to understand that its principal mass when cold is most frequently crystalline on account of the rhodonite which has crystallized. But the color is generally not a hand

* The direct effect of a relatively low temperature would, of course, be to thicken the slag, not to thin it. Professor Akerman probably means here that the low temperature hinders the slag from attacking the lining of the vessel and from taking up silica thence. Thus the slag remains relatively basic. A relatively basic slag is more fluid than an extremely acid one would be, even at a higher temperature.—*Translators.*

some red, except in the slags of hard steel, because the higher the percentage of ferrous oxide runs above 10 per cent. in the slag the more does the clear pink color of rhodonite change to a darker brown; and the longer the blow is continued after the boil the richer, of course, will the slag become in oxidized iron.

To the fluidity of the slag is due, in my opinion, the extraordinarily small tendency to red-shortness in the Swedish Bessemer products. For the more liquid the slag the more completely does it absorb the oxidized iron; while a viscid slag, because it cannot mix intimately with the mass of molten iron, leaves iron oxide in it; and thence results red-shortness.

The amount of manganese left in the iron itself by the more manganiferous pig irons certainly contributes still further to the same end, in that the oxidation of the iron is hindered by the metallic manganese present, which reduces again iron already oxidized; but if the

sulphur, phosphorus and silicon. Since it is nearly free from these elements there is naturally no need of adding manganese to counteract the injurious influence which their presence would occasion.

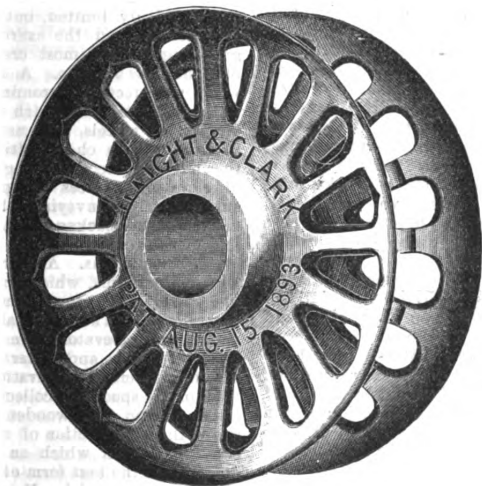
In what precedes, only the advantages of manganese have been presented; but it has its disadvantages also. It not only materially increases the cutting action of the slag on the lining of the converter, so that the durability of the tuyeres, bottoms and walls of Bessemer converters is rapidly diminished with the increase of manganese in the bath; but it also increases the waste, inasmuch as protoxide of manganese is by no means as effective in refining as ferrous oxide, while the slag, for this reason, as has already been shown, requires more of manganous and ferrous oxide together than of ferrous oxide alone.

Moreover, the waste depends partly, as said, on the temperature, to which it stands in inverse proportion, and partly on the degree of hardness of the prod-

contrary to the fact, that Bessemer blows in Sweden are hotter than in other countries.

Ice Cutting Trolley Wheel.

This wheel is intended to automatically remove ice or sleet from trolley wires, so as to leave the latter clean and in perfect order for the transmission of the electric current. Radiating from the hub of the wheel is a series of arms, the spaces between which are continued longitudinally across the hub in the form of grooves, which separate the ribs. These ribs form a continuation of the ice-breaking arms across the bottom of the groove, uniting the sides of the wheel, which have a flaring surface that will guide the trolley wire into the groove. This construction insures the cutting away of any ice that may have collected on the wire. This device is made by Haight & Clark of Albany, N. Y.



ICE-CUTTING TROLLEY WHEEL.

effect of manganese on red-shortness were confined to this, the manganese present in the pig iron at the beginning, at least when not above 2 per cent., could not be very effective in the manner now in question; because, if less than 2 per cent., it would be, as the table shows, so far removed during the earlier stages of the blow that the small remnant in soft iron could not possibly accomplish the result described. Experience, however, proves that red-shortness, even in soft iron, is prevented in some measure by an even smaller amount of manganese in the pig iron; and this circumstance confirms the opinion that even the manganese which has been slagged must have this effect. The manner in which this occurs certainly must be that the fluidity of the slag, increasing with the contained manganese, assists in washing away the oxidized iron, which otherwise would remain in the mass of iron and render it red-short.

The slight need in ordinary Swedish Bessemer works of a subsequent addition of ferromanganese (for generally only 0.2 to 0.6 per cent. is added), depends meanwhile by no means exclusively on the lower amount of oxidized iron in the product, but also upon the comparative freedom of the latter from

uct. Naturally, the waste will be greater the softer the iron produced, because to make the product softer we must blow longer, and the more iron is to be oxidized in a given time the less the contents of carbon in the bath of iron. It is, therefore, rash to give any exact numerical measure of the waste, but it would keep mostly between 10 and 10.5 per cent., though it may fall, on the one hand, to only 9, while, on the other hand, in the case of pig irons with higher manganese, it may rise to 12, and now and then even to 12.5 per cent.

Notwithstanding the small amount of silicon in the Swedish pig iron, the waste at our Bessemer works is not much smaller than is common elsewhere. This again stands in conjunction with the colder run in the converter which generally prevails here, and, in its turn, brings about the noteworthy difference, already referred to, in the character of the slags, in that our Bessemer slags, which are comparatively slightly acid and from that to somewhat basic, are very liquid in comparison with the decidedly acid and sluggish slags which are the common ones in other countries. The temperature being wrongly estimated from the fluidity of the slag, causes many to imagine,

The following is a comparison of the number of men employed at the principal manufacturing industries of Youngstown, Ohio, during the fall of 1892 and 1893 respectively:

	1892.	1893.
Brown, Bonnell & Co., rolling mills.....	1,800	50
Union Iron & Steel Company, rolling mills.....	2,500	25
Mahoning Valley Iron Company, rolling mills.....	1,200	50
Andrews Bros. & Co., rolling mills.....	600	20
Wm. Tod & Co., foundry and machine shop.....	350	175
Lloyd Booth Company, foundry and machine shop.....	250	125
Totals.....	6,700	445

This statement includes only the largest concerns. There are upward of 7000 workmen in Youngstown who have not had employment since July 1 this year, all of whom are dependent upon an early settlement of the wage scale as applied to mills making merchant bar iron, &c. Add to this number the men who are idle at Warren, Ohio, and at other mills, blast furnaces and factories along the Mahoning and Shenango valleys and the number will be not less than 10,000. It is a noticeable fact that no serious distress has yet been reported among this large body of unemployed workmen, but the effect is being felt among storekeepers who have extended credit in the hope of an early resumption of operations.

Love's Model City, near Buffalo, N. Y., promises soon to be a center of thriving industries. Work will be begun at once on the plant of the Empire Mfg. Company. It will consist of a foundry and machine shop. The Empire Mfg. Company are now located at Medina. They make plumbers' goods. The steam plant for the Casey Nailing Machine Company is being placed by John N. Day of Buffalo, and will soon be ready for operation.

A trolley road recently inaugurated in England is characterized by a marked difference from the methods adopted in this country. The wire is suspended from arms projecting from steel columns. No guy wires are employed, the steel wires being especially designed to withstand severe strain. The trolley arm is so constructed as to automatically engage the trolley wire in any position from 10 to 12 feet from the side of the car, so that curves may be taken at an angle instead of in a curved line, as in the American system.

WORLD'S FAIR NOTES.

The Falls Rivet & Machine Company

of Cuyahogo Falls, Ohio, maintain headquarters in Machinery Hall at F 28 for an exhibit of their power transmission machinery, such as shafting, bearings, floor stands, pulleys, clutch couplings, &c. Their devices are, however, shown in active use in other parts of the exposition. In Electricity Building the Fort Wayne Electric Company's exhibit has been fitted with the Falls Rivet shafting, &c. This shafting has run continually in use since the first of May. It is made from forged iron, turned, ground and lead copper for bearings. These bearings are ring oiling, and the oil has not been changed since the shafting was put in place, but the bearings are in as good condition as when first started. It is driven at 865 revolutions per minute, and although solid brick or stone foundations are not used, only wooden underpinning, there is no friction. On this shafting there are a cut-off coupling 80 inches in diameter with a 4-inch face and several friction clutch pulleys, from 64 inches in diameter with 18-inch face to 40 by 8 inches. Another exhibit is in connection with the power plant in Machinery Hall, where the Falls Rivet shafting is used by the Buckeye and Russell engines, operating large dynamos put in by the Standard and Fort Wayne electric companies. These are two of the largest light stations on the grounds. One of them carries a 60-inch belt. They have been in regular operation since April and have not given a particle of trouble. At the Buckeye engine is shown a photograph of a very large electric light plant to be put in on the Philippine Islands by the Manila Electric Company. The power to be generated is 1500 horse, driven by six Buckeye engines of 250 horse-power each, and the shafting will be furnished by the Falls Rivet Company, while the Brush Electric Company of Cleveland furnishes the dynamos. At the headquarters of the company at F 28 is shown a line shaft about 20 feet long, supported on floor stands, making it about breast high and thus easy of inspection. A hollow shaft is arranged in the center, forming a sleeve over the solid shaft. A friction clutch pulley, placed on the hollow shaft, is partly keyed to the quill and partly to the solid shaft. By this arrangement the hollow shaft or the solid shaft can be put in motion independently or together. Power can thus be applied at either end of the solid shaft or to the hollow shaft, as is frequently desired in electric plants. It is shown in operation by belts from the exposition shafting. Friction clutch couplings are also shown in connection with this shaft and the ring-oiling ball and socket pillow blocks. By this system of lubricating shafting, tempered steel rings are bent to circles enough larger than the diameter of their shafts to allow the lower portion of them to run constantly in oil. As the shafts revolve the rings revolve on them and carry up to the journals sufficient oil to lubricate them thoroughly. Any surplus of oil is removed by scrapers or wipers at each end of the bearings, and drops back into the oil receptacle. For extra large bearings, holes are drilled through the rings to allow a greater supply of oil to be carried up. The space is carpeted with a fine carpet, which extends under the

shaft, but not a drop of oil has fallen on it although the shaft is running most of the time, thus demonstrating the perfect manner in which this oiling device works. C. A. Babcock, general agent, is in charge of the exhibit. The company have branch offices at 8 South Canal street, Chicago, and 89 Cortlandt street, New York.

Crane Company

of Chicago make a very fine display of malleable and cast iron fittings, brass and iron valves and cocks and other articles in the steam and gas fitting line at Column O 28, Machinery Hall. Much ingenuity is shown in the arrangement of this exhibit, which is exceedingly attractive. A number of tall composite columns have been erected, composed in some cases of valves, tapering from large sizes at the base to very small sizes at the top. In other cases fittings have been coupled together, their curves forming graceful outlines, such columns also tapering from large ones at the base to small ones at the top. The space is of liberal dimensions, nevertheless but a small portion of the company's products can be shown, as they manufacture over 7000 articles of this description. The exhibit comprises brass globe and angle valves in a great number of sizes and styles, brass gate valves, brass cross and check valves, brass hose valves, brass butterfly and throttle valves, brass safety valves, brass radiator valves, brass steam cocks, brass gas cocks, brass union elbows, brass expansion joints, brass pump valves, hose nozzles, hose couplings, hose clamps, corporation cocks, brass elbows, tees and crosses, engine trimmings of every character, including whistles, iron cocks for steam, gas and water, iron body globe and angle valves, iron body cross valves, iron body check valves, iron body safety valves, back pressure valves, iron body butterfly and throttle valves, foot valves, iron body expansion joints, iron body gate valves, cast iron fittings, cast iron flange fittings, malleable iron fittings, &c. There has been an enormous growth in the varieties and sizes of goods of this character caused by the complications of the business, which have sprung up within a comparatively few years, and the Crane Company have made special efforts to keep pace with the progress of the trade. They are large manufacturers of wrought pipe and have their own iron and brass foundries, so that they possess peculiar advantages to meet the requirements of the business. The company also make an exhibit of their own automatic air brake in the Transportation Building.

The Lodge & Davis Machine Tool Company

of Cincinnati make a very large exhibit of engine lathes, turret boring and chucking lathes, radial and upright drills, milling machines, planers, &c., at Column K 42, Machinery Hall. The tools shown are arranged in show room style, as specimens of the company's products, and not in operation. Occupying a conspicuous position in the front of the display is a 16-inch tool room lathe, which is completely plated with gold and silver. The bolts, nuts, screws and other small parts are gold plated, while the bed, head and foot stocks, legs, &c., are silver plated. In the legs are cabinets for the storage of tools. The doors of these cabinets are gold plated, and the shelves are covered with blue silk plush. As a display piece this is one of the finest things to be seen in the machinery section. The engine lathes shown range from 16 feet

to 3 feet. The planers are 24 and 30 inch, the shafts and loose pulleys bushed with plain phosphor bronze sleeves. One of the radial drill presses is driven by an attached electric motor, and has a new quick return for the spindle. Quite a number of these tools were sold during the recent auction sale held by the company, the fortunate purchasers having secured great bargains. The operations of this company cover a wide field, stores being maintained in New York, Chicago, Boston and St. Louis.

Narragansett Machine Company

of Providence, R. I., make a display of foot-power machines at Column K 48, Machinery Hall. Six lathes are shown, which are adapted to a good range of work, and seem to be well designed for their special purpose. The carriage has some novel features.

The Jeffrey Mfg. Company

of Columbus, Ohio, have taken unusual pains to get up a unique and attractive exhibit of their conveyors and elevating devices at Columns O P 31, Machinery Hall. The floor space here assigned was decidedly limited, but by careful management and the exercise of very great ingenuity a most creditable display has been made. A tasteful pavilion was erected, a prominent feature in the decoration of which is a number of sprocket wheels, such as are used in connection with chain belting. Inside the pavilion are shown a great variety of elevating devices in operation, for automatically conveying all kinds of materials and packages. A coal-handling elevator with centrally hung buckets is conspicuous. A barrel elevator, with curved arms, which gently unload the barrel at the top of the hoist, is a neat device. There are also tile elevators, grain elevators, ore and broken stone elevators, and other devices for hoisting materials to elevations. In the back of the space is a collection of sections of iron and wooden troughs to show the construction of runways for conveyors, from which an idea can be obtained of the best form of trough for a particular material. Numerous samples of chain belting are displayed, the company being among the largest manufacturers of chain belting in the world. Two large portfolios are exhibited, containing blue prints of machinery manufactured by the company within the past few years for the handling of all sorts of materials either in bulk or package. In addition to the exhibit thus made of specimens of elevating and conveying machinery on a necessarily limited scale, the company are able to show some of their devices in practical operation doing regular work in the exposition. The paper workers' exhibit in Machinery Hall has a complete 200-foot Jeffrey conveyor constantly in service transferring material for them. In the Mines and Mining Building the company make a special exhibit of a complete plant of elevators, conveyors and screens as used in mining operations. A branch house is conducted by this company at 163 Washington street, New York.

The Abendroth & Root Mfg. Company

of New York make an exhibit at M 88, Machinery Hall, of Root's spiral riveted pipe in 25-foot lengths and varying from 8 to 16 inches in diameter. These pipes are galvanized, coated with coal tar and asphalt, also plain black, as the purchaser may desire or the usage to which they are to be placed requires. The spiral seam is the strongest portion of the pipe, as has been proven in

numerous experiments. This pipe is adaptable for water works use, distributing water mains and hydraulic mining. An advantage of this pipe is the ease with which it can be handled and transported, rendering it remarkably convenient for use in localities difficult of access or where skilled labor is scarce. A handsome lithograph of the Root water tube boiler as used in the great boiler house of the exposition is also seen here, encouraging the sightseer to investigate further.

Alexander Bros.

of Philadelphia, Pa., present a very attractive display of their pure oak tanned leather belting at K 28, Machinery Hall. The booth is built of black walnut, highly polished. On either side, standing on pedestals, each higher than the one in front, rest some 20 rolls of belting of all widths. These pedestals are so arranged as to form a half circle, in the rear center of which rests a handsome glass case, inclosing the company's name, and "Established 1867," with some tasteful leather decorations.

The American Hoist & Derrick Company

of St. Paul, Minn., have a display at F 99, in Machinery Hall, consisting of two of their hoisting engines. South of Machinery Hall and just west of the saw mill the same company have erected an office and covered platform, on which may be seen the parts forming the derrick that bears their name. Among them is a small though fine display of wire rope.

The American Leather Link Belt Company

of Chicago, Chas. A. Schieren, general representative, have two 15-inch link belts in use on the Ideal engines in Machinery Hall. In the Electrical Building they have an exhibit covered by a booth constructed of leather links in the Grecian style, decorated in bright colors. One of their 30-inch link belts of patent center joint link is displayed, also showcases enclosing curios, including samples of leather belting from 1880 to 1893, showing the vast improvement wrought in this industry in a little more than six decades.

Chas. A. Schieren & Co.,

at Chicago, have a beautiful booth in Machinery Hall for the display of their belting. It has an ebony and gold finish, is draped with French velour, and from the pale blue paneled ceiling a dozen incandescent lights shed a warm glow over the exhibit. In the center of the booth, on a raised platform and surrounded by an elaborate brass railing, stands the mammoth leather belt "Black Beauty," said to be the largest electric belt in the world. It is 96 inches wide, three ply in thickness, 800 feet long and has a net weight of 5650 pounds, there being 460 heavy steer hides used in its construction. Other belts surround the large one, indicating the numerous lines of manufacture. Two showcases prominently located in front contain specimens of round, solid, twist belt, rawhide rope and cut rawhide lace leather, also patent tan tip and their cement and Electric stuffing. The numerous diplomas awarded the company at Philadelphia, Paris and New Orleans are prominently displayed. The firm also make a very practical exhibit of 64 driving belts at work in various parts of the building, varying in size from 6 feet in width to 10 inches, and having a driving capacity of nearly 8000

horse-power. These consist of their Electric and patent perforated leather belts.

The Boston Belting Company

of Boston, Mass., have at J 27, Machinery Hall, a pyramid of mechanical rubber goods varying from specimens of coarse and fine Para rubber to the finest deckle straps. The corners of this fine exhibit are supported by large rolls of belting, one each of Imperial seamless stitched, frictioned surface, Forsyth's patent seamless and the Boston, while the pyramid is topped off by a large monitor nozzle and hydrant gate with four pipes attached upon which rests the American eagle. The booth is divided into two parts, the exhibit proper being fenced in, while a reception room for visitors, and office is situated south of the display. The entire space is covered by a bright canopy, while every inch of flooring is covered by the company's rubber mats so deftly arranged as not to overlap an inch. Among the numerous articles which compose the display are noticed belting, hose, packings, valves, car and wagon springs, rubber rolls, deckle straps, lithographers, and printers' blankets, &c.

A Ten-Wire Nail Machine.

Within the past two weeks a decidedly unique wire nail machine has been erected in Machinery Hall by the Powell Wire Nail Machine Company of 5 Euclid avenue, Cleveland, Ohio. It is located near the southeast corner of the fountain, in the center of the building. This machine is really ten machines in one. It is circular in form, the ten parts of the machine being placed on a massive table, receiving motion from its center. The motion is imparted in a novel manner. A heavy shaft runs to the center, where it is connected by suitable gearing with a vertical plunger. On the sides of the plunger are wedges which operate the ten sections as the plunger moves up and down. A coil of wire is placed on a reel below the table in front of each section, and the finished nails run down metal troughs into boxes by the side of each reel. The whole ten sections can be operated at one time on nails of the same size, or as many sizes can be made at a time as there are sections. When the whole apparatus is in operation it can turn out 2000 perfect nails per minute. Two persons only are required to attend to it. The simplicity of the machine is most striking, when its capacity is considered. By the movement of a lever any section can be thrown slightly forward so that the wedge on the plunger does not touch it, and it is then out of gear for adjustment or repairs without interfering with the operation of the other sections. The machine has just been perfected. It will probably not be built for sale, but used by the owners in the manufacture of wire nails for the market.

Charles H. Bealy & Co.

of Chicago make an interesting exhibit at Column I 49, Machinery Hall, of a number of specialties which they manufacture. Of these the Gardner grinder is the most prominent. It is a new tool, having but recently been brought out. It is designed primarily for grinding perfectly square surfaces. A steel disk, $\frac{1}{4}$ inch or more in thickness, has both sides grooved in concentric rings. Emery cloth or emery paper is then pasted to the sides, under heavy pressure, which forces the material into the grooves and causes it to adhere closely.

The disks are then mounted on suitable frames in pairs, one at each end of a short shaft. A rest for the article to be ground is fixed in front of the side of the disk, and is accurately adjusted, so as to hold the article perfectly square. Two persons can thus work at one grinder. When one face of a disk is worn it is reversed, and after both sides are worn the disk is easily recovered. Rests of different patterns are provided for special work, as, for instance, for grinding pulley faces. Numerous specimens are exhibited of the work done on these machines. Bealy's parallel clamps, now familiar to most machinists, are shown in great variety. Other articles exhibited are Gardner's adjustable stock and dies, Perfection oil cups and Helmet oil.

The H. W. Caldwell & Son Company

of Chicago have constructed at N 83, Machinery Hall, a pyramid nearly 60 feet high, upon which are fastened a full assortment of their worm screw conveying machinery, all in operation. The conveyors shown range from 4 inches in diameter to over a foot. Among other goods displayed are their gasoline and gas engines, seamless steel elevator buckets, automatic grain shovels, link belting and sprocket wheels, shafting, hangers, pulleys, belting, &c.

The Buckeye Iron and Brass Works.

of Dayton, Ohio, make a very large exhibit of fittings and other brass work at Column K 44, Machinery Hall. In finely arranged cases they show a great variety of handsome specimens of finished brass goods for special purposes. On a large platform are erected high columns of brass valves, tapering from huge sizes at the bottom to very small ones at the top. In addition to this display of finished products, the company exhibit machine tools of their own design which have some interesting features. One is a milling machine for milling squares or hexagons on valves, &c., which uses as many cutters as there are sides to be milled, all of which work simultaneously. Another machine is a forming lathe, with a vertical slide and an automatic feed. The latter consists of a feed rod running along the back of the machine, which drives a worm that moves the slide by means of bevel gears and a vertical shaft. The forming tool is adjusted easily and simply to suit the character of the work to be done. The forming tool slide has in its face a circular recess, having dovetails at the top and bottom which correspond with dovetails at the top and bottom of an adjustable block. The block, being inclined as desired, is held in position by a vertical clamping bolt.

The Hillis & Jones Company

of Wilmington, Delaware, contributed some of their machinery to the machine shop fitted up by Manning, Maxwell & Moore, but also make a very fine separate exhibit of boiler makers' and shipbuilders' tools in Machinery Hall at Column J 53. This exhibit comprises, first, very large plate straightening rolls. The first pair of rolls through which the plate passes are placed one over the other and are so heavy that when set closely they will elongate the plate if it happens to be sheared too short. Next comes a plate planer using two tools, which cut with the carriage moving either way, while the carriage is arranged to hold another tool to bevel the corners of the plate at the same time. This machine will plane plates of any length up to 32 feet at one setting. Then comes a double shear

for cutting angles, driven by an attached engine, which will cut up to 8-inch iron or steel angles. A vertical milling machine is shown, intended for heavy work, such as milling locomotive links. A very heavy machine shown is capable of being used either as a punch or a shear, the change being quickly made, and will shear $4\frac{1}{2}$ -inch round bars or punch 3-inch holes in 2-inch steel. It is driven by an attached engine. Another machine of the same character has greater depth of throat for boiler work, but is not so heavy, shearing plates up to $1\frac{1}{2}$ inches thick or 2-inch round bars, and punching $1\frac{1}{2}$ inch holes in $1\frac{1}{2}$ -inch steel. It is belt driven. A very small machine of the same kind is shown which shears 1-inch bars and $\frac{3}{4}$ -inch plate or punches $\frac{3}{4}$ -inch holes in $\frac{3}{4}$ -inch steel.

The Detrick & Harvey Machine Company

of Baltimore make an exhibit at Column J 41, Machinery Hall, which is numerically small but mechanically imposing. It consists of two open side planers of large capacity, generally shown in operation planing cast iron. In setting these machines, brackets were attached to the upright to support the countershaft, thus doing away with the necessity of building a frame work for this purpose over the entire exhibit. One of the machines has a supplemental rolling table to support a very large piece of work which might tip the platen from its bearings. This table is formed of two steel beams, one of them over the other, with rollers between. They are set on cross rails and can be placed at any distance from the tool. These machines are driven with spiral driving gear and make a very heavy cut.

The Richle Bros. Testing Machine Company

of Philadelphia make a comprehensive exhibit of their apparatus at Column O 25, Machinery Hall. Tests of a great variety of materials are constantly being made on 12 machines, which range from what is claimed to be the largest vertical testing machine yet constructed to a small device for testing cloth. The great testing machine which forms the leading feature of the exhibit is capable of exerting a compression, tensile or transverse strain of 150 tons. Short as well as long pieces are tested equally well with this machine. It has an adjustable upper head, which can be moved by power to fit the test piece. The test is then made by the movement of the lower head alone. The screw beam operates automatically by electricity. The specimens shown of the tests made on this machine, which cover large steel bars, heavy timbers, &c., prove its large capacity. Another vertical machine is shown, which has its upper head stationary. A 200,000-pound horizontal machine is used for testing car couplers, links and chains. A new 100,000 pound vertical machine has an automatic electric beam, with an autographic attachment for registering strains. In this machine the poise moves out on the beam as the strain increases, and keeps the beam in equipoise until the test piece breaks, but remains in its place a sufficient time for the reading to be noted, after which a reversing gear automatically returns it to zero. A spring testing machine shown will test to 80,000 pounds. There are machines for the use of foundrymen in testing cast iron bars, torsional and cement testing machines and cloth testers. The extensometer used by Col. W. H. Paine, which was the

means of proving entirely safe the condemned Niagara Suspension Bridge some years since, is among the smaller exhibits shown. It is an instrument for testing the elongation of wire forming the cables of a bridge. When applied in the case of this bridge it showed that the strain of the load carried was well within the elastic limit of the cables. The bridge has been in regular use since, and is still considered entirely safe, although condemned at that time by eminent engineers.

The Chicago Rawhide Mfg. Company

have a practical exhibit at the fair in the shape of nearly 100 belts, varying in size from 38 inches in width to 1 inch, in regular operation. Over 40 of the fans running in Machinery Hall are propelled by belting manufactured by this company and adjusted by E. W. Hains, who has charge of their exhibit proper, at Column J 28. Here may be seen goods of their manufacture from a $\frac{3}{4}$ -inch twist belt to a 2-inch rawhide rope. Here also are displayed samples of their flat, rope and twist belting; laced leather sides and cut lace leather, halters, straps, &c. Their rawhide rope, made of strips of leather twisted like the strands of an ordinary rope, is a remarkably strong material, while its exceeding durability makes it specially valuable for hard service.

James Boyd

of St. Paul, Minn., has succeeded in making an exhibit which, to say the least, few people pass without seeing, for the automatic engine constantly in operation raising and lowering elevators cannot fail to attract attention. The exhibit is at J 81, Machinery Hall. Here are shown elevators for builders' use which may be operated by hand or horse power or propelled by steam, the last named working automatically. The hoisting engine shown is reversible, with drum and sheave compactly constructed. The steam elevator constantly in operation is propelled by compressed air brought from the Rand & Ingersoll compressors 300 feet away. It passes into the boiler and is operated through the cylinders the same as steam. The elevators are geared to the engine so that it carries one cage up about 50 feet while the other descends, and then by an automatic device the engine is reversed and the process repeats itself. These elevators run in wire rope guides and are easily adjusted to be used in the erection of new buildings, superseding the time-honored hod carrier and his ladders.

The Dodge Mfg. Company

of Mishawaka, Ind., have a handsome booth of cherry at F 27, Machinery Hall, for the exhibition of their power transmitting appliances. They display among other specialties a friction clutch of 200 horse-power which runs on a quill. The line shaft is thus relieved of heavy belt strains from power connections not in motion as well as the laboring or driving motive power and has only the torsional or transmission strain to resist. The main driving pressure is thrown into an independent set of journals which support the quill, the pressure per square inch of bearing being greatly reduced from that which occurs in main connections direct to shaft. At the rear center of their booth the Dodge Company show a number of special pulleys such as double and single cone pulleys, flanged pulleys, disk pulleys for flour mills, &c. A pyramid is formed of their Independence wood split pulleys (so called on account of

the patent having been granted on July 4), while hangers and plate and compression couplings help to complete an attractive display. A transparency of their large plant at Mishawaka, Ind., lit from behind by incandescent lights so as to illuminate the windows, adorns the back wall. The attention of the trade is called to the company's bushing, constructed so as to fit any size shafting.

The Erwin-Welch Hydraulic Machine Company

of Chicago have on exhibition, in operation, at Column I 34, Machinery Hall, their automatic hydraulic pump, water motors, automatic cellar drainer and a hydraulic ram of Rife's manufacture, at Roanoke, Va. In the last named, instead of a metal valve, a rubber one is used, which has been found to be a great improvement in not wearing the metal, while it may be adjusted to any pressure of water. Another feature which recommends the ram is that it automatically supplies itself with air. The automatic hydraulic pump above mentioned avoids dependence on the suburban storage tank, and is capable of supplying four or six families without the tank or from 40 to 50 with it.

The Flint & Walling Mfg. Company

of Kendallville, Ind., have two exhibits, one at Column J 35, in Machinery Hall, and the other in the wind mill district outside. At the first-named location their well-known Hoosier lift and force pump is shown, adaptable to wind or hand use. Spray pumps and various other descriptions are also shown, while the feature which attracts most attention is undoubtedly an 8-foot mill on which the arms of the wheel are alternately finished in copper and brass while the casings are handsomely nickel plated. This wheel revolves and forms a part of the miniature water works for use in residences which is shown. Over in the wind mill section their Star mill proves worthy of its name. It has a direct stroke and is back geared, is simple in construction and perfectly self-governing, the crank movement doing away with side draft. These wheels are made from 8 feet to 26 inches in diameter.

The Reeves Pulley Company

of Columbus, Ind., have the giant pulley of the exposition in their display of wood split pulleys at Column H 27, Machinery Hall. It measures 18 feet in diameter, has a 12-inch face and fits an 8-inch shaft. The size of the pulley was limited by the space allotted them, it having been the original intention to place a 32-foot pulley on exhibition. The standard which they have erected for the support of the large pulley tends to show more clearly the construction of their pulley arms. A square shoulder is found on the edge of all the Reeves pulleys, and they may be headed up if desired. The large pulley shown attracts a great deal of attention, particularly of foreigners, who are unused to seeing wooden pulleys of such huge dimensions at home. This company have a very attractive booth of oak and poplar, with a neat fencing around the outside, into which several pulleys have been worked. A pyramid of pulleys ranging in diameter from 60 to 6 inches is also shown. The Reeves Company call special attention to their bushings, which are interchangeable and graduated in thickness so that any pulley may go on any thickness of shaft under $3\frac{1}{2}$ inches. They maintain a Chicago branch at 58 and 60 South Canal street.

Inclinable Drawing Press.

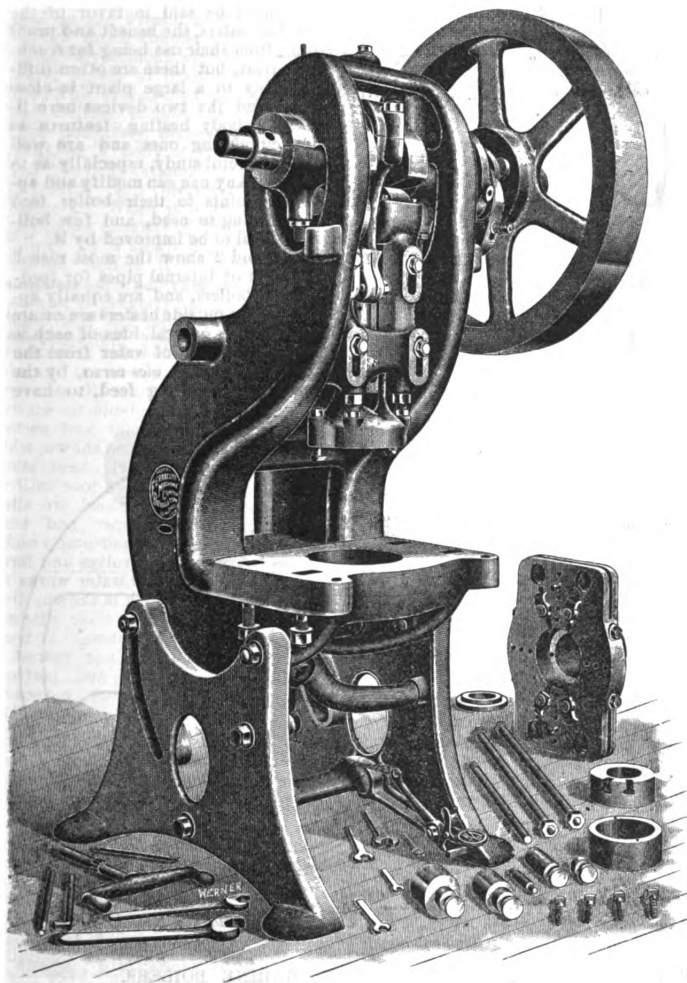
This Ferracute inclinable drawing press differs materially from the one by the same makers, the Ferracute Machine Company of Bridgton, N. J., from designs by Oberlin Smith, which was illustrated in *The Iron Age* of September 28. This machine is built with a frame so mounted upon its legs as to be quickly inclinable to any desired angle by a convenient elevating

The spring ram lifter is arranged with an equalizing lever, so that the lifting is practically equal all the way up, together with a positive lifting device connected with pitman so that the cams cannot leave the rollers in case the spring lifter should fail.

The ram has a very large hole for deep punches to pass up into, and yet has solid metal to which the upper dies may be fastened by the hooked clamps provided, together with a plunger having a large and long hole for shanks of

which can be quickly inserted in the frame, thus making the press nearly as stiff as a straight column press, upon certain occasions where great rigidity is required, and where it is not necessary to pass long sheets through sideways, as is usually done in throated presses.

An automatic stop clutch and clutch plate carrying the tripping device are provided as in the press previously described. The four hardened wheel studs for driving in the hub of the fly wheel, and the self-acting locking pins, are of the same design as in the other press. Three smaller and two larger sizes of presses of this same design are also built.



INCLINABLE DRAWING PRESS.

screw, and proper clamping nuts for securing the same.

Its weight is 4700 pounds and its dimensions, &c., as follows: Round hole through bed, 10 inches; throat from ram center back to frame, 9 inches; height bed to ram, with ram up, 12 inches; stroke of ram, 2½ inches; adjustment of ditto, 3 inches; height bed to plunger, when up, 17 inches; stroke of plunger, 5 inches; adjustment of plunger, 3 inches; fly wheel, 42 x 6 inches; and weight of same, 1150 pounds; speed of fly wheel, 180 revolutions per minute; thickness of bolster, 3 inches; and round hole in same, 7½ inches; pressure safely exerted by ram, 52 tons; maximum diameter of work, 7 inches; and depth, 2 inches; maximum blank diameter, 11 inches.

punches, with a locking arrangement which moves them positively up and down, but allows sufficient play so they may enter their dies accurately and centrally, while at the same time leaving room to put in bushings to fit various odd punches which may be required.

The bolster is provided with a deep and heavy truss extending down into the bed of the press so that it may remain perfectly flat and yet can be tipped slightly out of level at its different corners by four sliding wedges driven by screws and nuts, while at the same time its thin and elastic edges are firmly clamped to the bed of the press, thus enabling dies to be accurately aligned to each other to prevent wrinkling of work.

A pair of stay rods are furnished

A Modern Factory Building.—The building in course of erection for the Diamond Machine Company of Providence is in many respects the finest edifice of the kind in that city. The land upon which it stands has a frontage of 450 feet on Atwells avenue, a depth of 350 feet on Kingsley avenue, bounded on the north and east by the Woonasquatucket River, leaving ample and sufficient accommodation to erect further buildings of this class when they are required. The building is 205 feet long, 60 feet wide, is set 12 feet back from the street line, built of brick and granite, foundation stone of the very heaviest material, foundation walls 4 feet thick, granite underpinning 23 inches deep, 8 inches wide, 1½ wash, brick wall on the first floor 24 inches, on the second 20 inches, on the third 16 inches. Height of stories 14 feet from top of floor to top of next floor. The floor beams 10 x 16 of Georgia hard pine, all floors covered with 4 inches spruce plank, with the top floor 1-inch maple, tongued and grooved. There is no basement under the building. The latter is filled up with coarse gravel, made thoroughly compact by wetting down with water, then concreted on top, upon which rests 4 inch spruce planks with 1 inch top maple. The windows are 11 feet high, 5 feet wide, arched and arranged with transoms at the top to secure good ventilation. The floor beams 10 x 16, stand 9 feet apart, are supported by posts on the lower and upper floor, 10 inches diameter, the latter turned round, bored through the center to prevent checking, with two coats of linseed oil upon them. These posts are supported on granite underpinnings 4 feet square, which rest upon foundation walls extending 11 feet below the floor. There will be three sets of double doors for machinery and two end doors for the operatives, one on each floor at the rear of the building. The machinery doors are 11 feet high, 7½ feet wide, 8 inches thick and paneled. There are no chimneys in the building, which is to be supplied with modern sprinklers. Two sets of stair cases with maple treads, 2 inches. Norway pine partition stock, 2 inches. The building will have a gravel roof 5 ply, first 3 ply, of the best Beaver brand and a wash on top of that, covered with Oyster Bay white gravel.

There are two lines of shafting on each floor, elevators for hoisting purposes. The factory is to be lighted by electricity. The power is supplied from a separate building of brick and granite, erected upon their land (40 x 50) where engine boiler and blacksmith shop are contained. A 75 horse-power engine with 100 horse-power boiler is to be used. It is designed by the builders to secure a strong rigid building with strength sufficient to meet every requirement in the business, perfectly

lighted and ventilated, protected from fire by all modern improvements. Their office is to be located at the east end of building on the lower floor. No attempt in this or any other part of the building to secure ornamental work of any kind has been made.

Two Modern Methods of Introducing Feed Water Into Marine Boilers.

That the marine boiler should require a greater degree of care in its general management than the land or stationary boiler may not, at first glance, appear to be reasonable, nor is it contended that such precautionary measures as may be considered best for the former are not also well adapted to the latter; but it is a well-known fact that the land boiler, by reason of its greater accessibility, more advantageous situation, simpler heating surfaces and freedom from over forcing, is in a great measure relieved from those excessive strains and destructive influences which are constantly affecting the boilers of a steamship. Besides this, on shore it is not difficult to provide large and efficient outside feed water heaters, all needed room being available, while in the hold of a steamer this is less readily done. Of necessity the marine boiler is more cramped in its quarters or allotted

to exist without imperiling the structure through the stress brought by the unequal expansion of the parts, and it is to the proper and best method of introducing this feed water (be it hot or cool) that much attention is now being given by all steam users and more especially by those engaged in marine work, for even the hottest feed water may be introduced so as to fail in its best point—that of aiding in producing a good circulation. This feature has too frequently been overlooked by those who

to provide for in multitubular boilers, an effective artificial one is not difficult to arrange. He must keep in mind that simply deflecting the feed downward by an internal bend is not effective, for while it does provide against the direct impingement of cool water upon very hot surfaces, it at the same time sends the cool water to that part of the boiler already cooler than the rest and fails to help matters. This faulty practice existed until only recently with very prominent builders and designers, but has been summarily dropped except by those too careless of principles. Too much cannot be said in favor of the feed water heaters, the benefit and profit accruing from their use being far reaching and great, but these are often difficult to apply to a large plant in close quarters, and the two devices here illustrated embody heating features as well as circulating ones and are well worthy of careful study, especially as to principle. Any one can modify and apply these points to their boiler feed pipe, according to need, and few boilers would fail to be improved by it.

Figs. 1 and 2 show the most recent arrangement of internal pipes for feeding marine boilers, and are equally applicable where outside heaters are or are not used. The general idea of each is to induce a transfer of water from the top to the bottom, or *vice versa*, by the current of the entering feed, to have

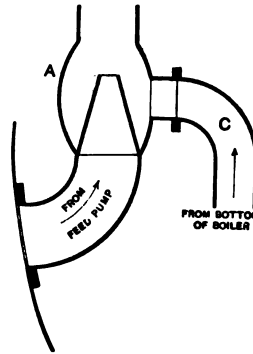


Fig. 3.—Injector.

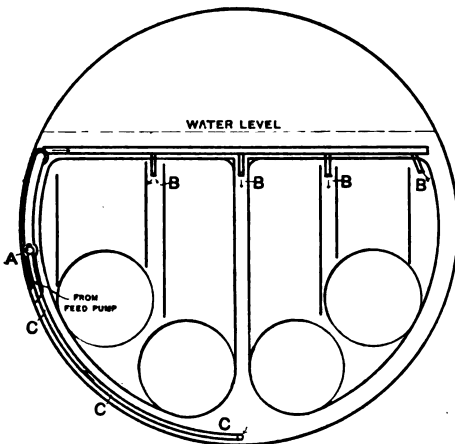


Fig. 1.—Section of Marine Boiler.

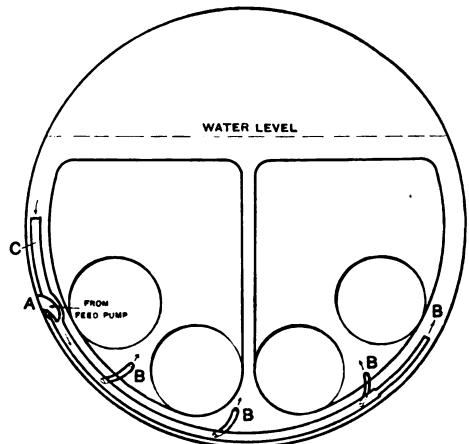


Fig. 2.—Section of Marine Boiler.

TWO MODERN METHODS OF INTRODUCING FEED WATER INTO MARINE BOILERS.

space, and in its proportion of heating surface, so that in order to preserve it for a rational "life time" there can be no relaxation of watchfulness nor any preservative method neglected. Since the adoption of forced draft, whereby such an increase of power has been obtained, the temperature in furnaces and tubes has risen greatly, and many casualties have occurred and many boilers been practically destroyed or rendered unfit for their designed purpose just by attempting to produce this increased power without any additional precautions being taken in management against the injurious effects of allowing cold air to rush in open furnace doors or feed water being badly directed or of too low a temperature.

The old conditions of having comparatively cool water in the bottoms of the boilers while that of the upper portion is boiling can no longer be allowed

have adopted the use of feed water heaters and thought that included all the needed precautions, but it is as much an element of life to the boiler, or even more so, than sending the feed in hot, for where by reason of bad or faulty design a good natural circulation does not exist, that portion of the heating surface which properly should be most efficient is deprived of the close and constant supply of water and soon becomes burnt and leaky, or even dangerous. Many ruined crown sheets and tube ends owe their failure to this defect rather than to high furnace temperature or cold feed.

It behooves, therefore, every user of steam boilers, either ashore or afloat, to satisfy himself that he is not injuring his boilers nor wasting his costly coal pile through a defective feed system and faulty circulation, and while a good natural circulation is almost impossible

the induced stream mix with the feed while still in the pipe, and to distribute the thus heated water uniformly and at various points through small branches whose aggregate area slightly exceeds that of the main. In that shown in Fig. 1, the entering water is directed upward through an injector nozzle, A, Fig. 3, which is contained within the pipe, and as the stream rushes upward it induces another stream through the connecting pipe C, which takes its water from the very bottom of the boiler by a perforated branch running longitudinally there. This induced stream mingles with the feed and is carried up over the tops of the tubes, through the hottest water, and is delivered by the small branches B B B downward between the tube nests. This is a forced circulation which is obviously excellent and has been successfully adopted by one of the largest

shipbuilding firms in the country, who originated it.

The next device, Fig. 2, is, probably, even a better plan, and is just the reverse of the first in its operation. The feed here is directed downward by a similar nozzle, and the induced current is drawn from the hottest water nearer the top. This mingled feed is thus greatly heated and is delivered at the bottom of the boiler through small branches directed backward and upward toward the back tube sheets, the most important point to have well supplied with water. The latter plan is somewhat on the principle of the circulator used on the French cruiser "Forbin," though much simpler. There a small metal valved pump was attached to each boiler solely to draw water out from about the level of the top of the furnaces and deliver it into the very bottom, thus positively preventing the settlement of a body of cooler water there and proving extremely successful as a circulator and preserver of heating surfaces. When it is realized what an enormous quantity of feed water is required by a single one of the larger marine boilers it is not difficult to understand the effectiveness of the stream, if properly directed, as a circulator and the importance attached to the operation. For instance, one modern

The Calculation of Limestone Charges for Iron Blast Furnaces.

BY S. P. BJERREGAARD, IVANHOE, VA.

It is of the greatest importance to be able to calculate accurately the amount of limestone of a given composition to be charged with a given ore mixture. The method used for this purpose must be scientific and easily turned into practice. It must be comprehensive and elastic enough to be applicable to all variations in composition of stone, ore, or per cent. of silicon desired in the pig iron, &c.

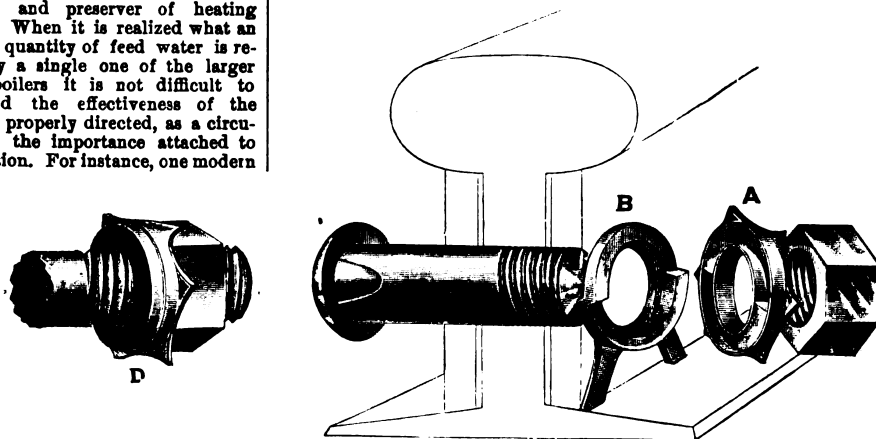
The oxygen ratio method is well known, but is not entirely satisfactory, because it yields slags that vary in composition with varying compositions of ore or stone. A. Roessl, in *The Iron*

sired in the iron multiplied by the percentage of iron in the ore, and divided by 100.

III. The per cent. of pure CaCO_3 required by the ore is the product of the figure found in II by that found in I.

IV. To find the stone equivalent to pure CaCO_3 , multiply the per cent. of MgCO_3 in the stone by 1.191 and the per cent. of Al_2O_3 by 0.9806, and add these products to the per cent. of CaCO_3 . Multiply the per cent. of SiO_2 by 1.661 and subtract the product from the sum of the CaCO_3 equivalents. The result will be the per cent. of available CaCO_3 in the stone.

V. Multiply the per cent. of pure CaCO_3 required by the ore mixture, as found by III, by 100, and divide by the available CaCO_3 in the stone, as found by IV. The quotient is the per cent. of stone required by the ore.



THE COLUMBIAN NUT LOCK.

eight furnace boiler (double ended) with usual size grates will, under forced draft, require about 20 tons of feed water per hour.

The Columbian Nut Lock.

A self-tightening nut lock has just been brought out by the Columbian Nut Lock Company, 14 Pacific avenue, Chicago. Illustrations herewith given show its special features. Two washers are used, which are lettered A and B. The washer A is six sided, with a lip on every side, any one of which can be turned over on one of the sides of the nut. The washer B has forked ends, which are intended to rest on the angle bar or flange of the rail. Both washers have inclined faces, the thin edge of one being intended to be placed opposite the thick edge of the other. When in place and the nut is tightened, one of the lips of washer A is bent by a punch or cold chisel over a side of the nut, as shown in D. If the bolt should be loosened by jar or other causes, the nut in unscrewing carries the washer A round with it, and the thick edge of the washer climbs the incline of washer B, which cannot move. The slack is thus taken up as fast as it occurs, the action which loosens the nut serving to tighten it. These nut locks are now made of malleable iron, but will also be furnished very shortly in soft steel.

Age for April 9, 16 and 30, and December 8, 1891, has published another; but according to our experience at Ivanhoe, the results do not correspond to the expectations.

These and other considerations led me to examine into the subject, and I will here give my results:

Rules.

I. Take a given slag composition found by experience with the furnace to yield good results (this may be called for convenience the "typical" slag), multiply the percentage of MgO contained therein by 1.4, and that of Al_2O_3 by 0.823, and add these two figures to the percentage of CaO . Multiply the whole by 1.786. Divide the product by the percentage of SiO_2 in the slag, which is the same as that desired in the slag to be produced by the ore mixture and limestone. The quotient represents the amount of pure CaCO_3 required by each unit of free silica in the ore mixture.

II. The free silica in the ore mixture is found by subtracting from the total silica the following products:

- The per cent. of Al_2O_3 in ore multiplied by 0.5901.
- The per cent. of CaO in the ore multiplied by 0.7826.
- The per cent. of MgO in the ore multiplied by 1.026, and
- Twice* the per cent. of silicon de-

* This is accurate for all practical purposes. The true figure is 2.127.

Example.

	Typical slag.	Ore mixture.
Iron (metall.)	...	47.0
Silica	36.0	15.7
Lime	46.0	0.5
Magnesia	5.0	0.1
Alumina	13.0	3.9
Total	100.0	

Limestone.

CaCO_3	92.0
MgCO_3	5.5
Al_2O_3	1.5
Silica	1.0
Total	100.0
CaO	51.55
MgO	2.88

The iron is required to contain 2.5 per cent. silicon; sufficient fuel must, of course, be used to attain that result.

$$\text{I. } (5 \times 1.4 + 13 \times 0.823 + 46 \times 1.786) = 8.18$$

Hence the amount of pure CaCO_3 required per unit of free SiO_2 is 8.18.

$$\text{II. } 3.9 \times 0.5901 = 2.30$$

$$0.5 \times 0.7826 = 0.39$$

$$0.1 \times 1.026 = 0.10$$

$$2.30 + 0.39 + 0.10 = 2.79$$

$$2 \times 2.5 \times 47 = 2.36$$

$$100 = 5.14$$

$15.7 - 5.1 = 10.6$, viz., the per cent. of free silica in the ore is 10.6. The amount of SiO_2 entering the slag will be $15.7 - 2.35 = 13.35$.

III. $10.6 \times 8.18 = 84.81$. Or the per cent. of pure CaCO_3 required by the ore mixture is 84.81.

$$\begin{array}{rcl} \text{IV.} & 5.5 \times 1.191 & = 6.55 \\ & 1.5 \times 0.9862 & = 1.47 \\ & 92 \times 1 & = 92 \\ & \hline & & 100.02 \\ & 1 \times 1.661 & = 1.66 \\ & \hline & & 98.36 \text{ viz.,} \end{array}$$

the amount of available CaCO_3 in the stone is 98.36 per cent.

$$\begin{array}{rcl} \text{V.} & 34.31 \times 100 & = 34.9 \\ & 98.36 & \\ & \hline & & 34.9 \end{array}$$

Hence the amount of this stone required for the supposed ore mixture is 34.9 per cent.

Proof.

The composition of the slag produced, according to the preceding example, will be:

	From 100 parts ore.	From 34.9 parts stone.	Total.	Per cent. composition.
SiO_2	13.35	0.35	13.70	38.40
CaO	0.50	17.99	18.49	49.15
MgO	0.10	0.92	1.02	2.71
Al_2O_3	3.90	0.52	4.42	11.74
			37.68	100.00

So that we have obtained a slag with 86 per cent. SiO_2 , which is what we set out to attain.

The foregoing rules may also be expressed by the following algebraic formula:

$$178.6 (1.4c + 0.823d + b) (f - 0.5901g - 0.7826h - 1.026k - \frac{1}{4}l) a (1.191m + 0.9806n + l - 1.661q) = x, \text{ in which:}$$

- a = per cent. SiO_2 in typical slag.
- b = per cent. CaO in typical slag.
- c = per cent. MgO in typical slag.
- d = per cent. Al_2O_3 in typical slag.
- e = per cent. Fe in ore mixture.
- f = per cent. SiO_2 in ore mixture.
- g = per cent. Al_2O_3 in ore mixture.
- h = per cent. CaO in ore mixture.
- k = per cent. MgO in ore mixture.
- l = per cent. CaCO_3 in stone.
- m = per cent. MgCO_3 in stone.
- n = per cent. Al_2O_3 in stone.
- q = per cent. SiO_2 in stone.
- s = per cent. silicon in iron to be made.
- x = per cent. stone required for ore mixture.

Chemical Principles.

The molecular weights of CaO and MgO respectively are 56 and 40, hence we have the proportion: Equivalent per cent. $\text{CaO} : \text{per cent. MgO} :: 56 : 40$. This proportion may be written as an equation, thus: Equivalent per cent. $\text{CaO} = \frac{\text{per cent. MgO} \times 56}{40}$. In other

words, the amount of CaO equivalent to a certain amount of MgO is found by multiplying the MgO by $\frac{56}{40}$ or 1.4.

Similarly, the amount of CaO equivalent to a certain amount of Al_2O_3 is found by multiplying the amount of Al_2O_3 by 0.823. In calculating this factor 0.823, however, due regard must be given to the difference in quantivalence between CaO and Al_2O_3 . Having obtained the amount of CaO equivalent to the percentages of MgO and Al_2O_3 present in the typical slag we proceed to add it to the percentage of CaO present, in order to obtain the total lime equivalent present in the slag. The stoichiometrical relation between CaO and CaCO_3 is that of 56 to

100, hence to convert the amount of CaO into the equivalent amount of CaCO_3 we multiply by $\frac{100}{56}$, or 1.786. This product gives the amount of pure CaCO_3 required to saturate the total silica of the slag. By dividing it by the amount of silica, we obtain as the quotient that amount of pure CaCO_3 required to saturate one unit of SiO_2 , in order to produce a slag similar in composition to that with which we started, and which we called the "typical" slag. In precisely the same manner as above shown are found the factors required to convert the bases of the ore into their equivalent amounts of SiO_2 , as given under II. The factors given under IV in the same manner serve to convert the amounts of MgCO_3 and Al_2O_3 into their equivalent amounts of CaCO_3 . The principles involved in III and V are self-evident and do not need explanation.

For convenience of reference the following tabulation of all the factors is given:

Per cent. given.	Equivalent sought.	Factor.	Logarithm.
CaO	CaCO_3	1.786	0.251481
MgO	CaO	1.40	0.146128
Al_2O_3	SiO_2	0.5901	9.770628-10
MgCO_3	CaCO_3	1.191	0.075812
Al_2O_3	CaCO_3	0.8906	9.951215-10
SiO_2	CaCO_3	1.661	0.223370
CaO	SiO_2	0.7826	9.893540-10
MgO	SiO_2	1.026	0.011147
Al_2O_3	CaO	0.823	9.915400-10

It will be noticed that no account is taken of the fuel ash in the example

pulleys without slipping. The general agent for this belting is H. N. Green of 254 Fulton street, Brooklyn, N. Y.

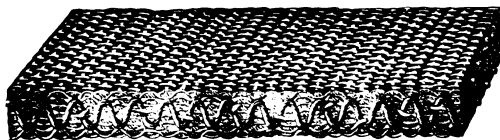
Treasury Decisions.

"Blue Billy" or "Purple Ore"—Dross or Residuum from Burnt Pyrites in Bricks

Before the United States General Appraisers at New York, August 30, 1893. In the matter of the protest, 19,245-942, 19,330, 19,321-955, and 19,322-956, of Thomas M. Norris & Co., against the decision of the Collector of Customs at Baltimore, as to the rate and amount of duties chargeable on certain purple ore (residuum from burnt pyrites), imported per "Sedgemoor," January 4, 1893; "Queensmore," December 31, 1892; "Queensmore," February 27, 1893, and "Queensmore," March 8, 1893. Opinion by Sharretts, General Appraiser.

The merchandise in question is the dross or residuum from burnt pyrites, known commercially as "blue billy" and "purple ore." This substance was imported in blocks or so-called bricks 9 x 6 x 5 inches in dimensions and weighing about 30 pounds each, and not in the form in which dross or residuum from burnt pyrites is usually imported, namely, in a powdered or granulated condition.

It appears from the record, and we find as facts, that these so-called bricks are made by pressing in a machine, perfected for that purpose, a given quantity of residuum of burnt pyrites and



Longitudinal Section.

THE MADDOX COTTON AND WIRE BELTING.

quoted. If necessary or desirable this ash may be treated exactly like the ore mixture and the resulting per cent. of limestone added to that required by the ore.

The Maddox Cotton and Wire Belting.

The Maddox belting is made of cabled soft steel wire and cotton, solidly woven together. The cables of wire are each composed of six steel wires twisted together. These cables are laid lengthwise in the belt, about $\frac{1}{4}$ inch apart, forming about one-half of the warp, the rest of the belt being composed of cotton yarn. The cotton filling, or woof, is woven solid with the warp (there being no plies to pull apart), the process of weaving causing the cables to become corrugated in form, or doubled back and forth through the thickness of the belt. It is stated that this method of making the belt gives it great strength and toughness, and also unusual flexibility. The wires are completely covered by the cotton so that they do not come in contact with the pulleys. It is claimed that the cotton forms an elastic and rough face that prevents the forming of air cushions between the belt and pulley and permits the belt to drive the entire power of the

burning the same in a kiln, fitting the substance for immediate use in blast furnaces, and thus differentiating it from the dross or residuum from the burnt pyrites of commerce, which has to be mixed with slag, dirt or foreign substances before it can safely be cast into blast furnaces and the iron extracted therefrom.

The appellants set up three claims in their protest, to wit:

1. That the merchandise is dutiable at 20 per cent. ad valorem under paragraph 202 as metal unwrought.

2. That said merchandise is dutiable at 20 per cent. ad valorem as an unenumerated manufactured article in accordance with the provisions of section 4.

3. That said merchandise is denominatively provided for as bricks, other than fire bricks, and is dutiable at 25 per cent. ad valorem under paragraph 94.

The board finds as matters of law—

1. That the merchandise is specifically provided for in paragraph 133 as dross or residuum from burnt pyrites.

2. That it is not *ejusdem generis* with the articles named in paragraph 94.

3. That it is not metal unwrought, the metal in use never having been extracted therefrom.

4. That it is residuum from burnt pyrites, placed in the most convenient

form for use and not made into a new and different substance therefrom by any process of manufacture.

We overrule the protests and affirm the Collector's decision in each case. The board has not considered it necessary to pass upon the issue raised in the protest touching the value of the merchandise, inasmuch as we hold the said merchandise is subject to a specific duty per ton, and the amount of duty chargeable thereon in nowise affected the value thereof.

OBITUARY.

GORDON M'DOWELL.

Gordon McDowell, late president of the South Chicago Foundry Company, died at South Evanston, Ill., on the 26th ult. He was but 80 years of age and was born in Cincinnati. He had retired from business on account of his health, but had partially regained it and was arranging to resume when he was seized with fatal illness.

MARTIN CROISSANT.

Martin Croissant, hardware merchant and manufacturer of store ladders, Albany, N. Y., died at his home in that city on the 27th ult. Mr. Croissant was born in Germany 69 years ago and has been a resident of Albany for the past 48 years, during which period he has been a dealer in hardware, and was perhaps the longest established hardware merchant of the city.

PERSONAL.

Wm. Martin, for a number of years secretary of the Amalgamated Association, at Pittsburgh, but for the past two years or more connected with the Carnegie Steel Company, Limited, at Pittsburgh, has severed his connection with that firm. The position filled by him, which included looking after the labor interests of the firm, has been abolished.

John D. Fouquet has withdrawn from the service of the New York Central system of railroads. He has opened an office at 85 Broadway, New York, and will furnish plans and specifications for all classes of architectural work, making a specialty of railroad structures.

P. W. Shimer of Easton, Pa., analytical chemist, announces that while still prepared to do general analytical work, he proposes hereafter to give almost undivided attention to the analysis of iron and steel, coal and coke, ores, limestone, slag, water, &c.—in short, everything that has any connection with the metallurgy of iron and steel.

Taking effect Monday, October 9, 1898, the rate on railroad spikes, carloads 24,000 pounds and over, from Pittsburgh, Pa., and points taking same rates to St. Paul, Minn., and points taking same rates will be 28 cents per 100 pounds; to Duluth, Minn., and points taking same rates and intermediate points the rate will be 18 cents per 100 pounds.

The usual advance on iron rates made in the fall of each year went into effect on Sunday, October 1. The rates from Pittsburgh to Chicago were advanced from 17½ cents to 20 cents per 100 pounds for less than carload lots, and from 15 cents to 17½ cents for carload lots.

Trade Publications.

THE WASHBURN SHOPS of the Worcester Polytechnic Institute of Worcester, Mass., have issued a catalogue describing the Worcester drill grinder made by them. These are very simple in design and are intended to meet all the requirements of machine shops, either large or small.

GEO. T. McLAUTHLIN & Co. of 120 Fulton street, Boston, send out two catalogues. One describes the Magic crusher for reducing rock, ores, &c., and the Magic pulverizer. The other describes the Hoadley portable and stationary engines, the McLaithlin drop tube safety boiler and the "test" turbine water wheels.

WE HAVE RECEIVED from the Murray Iron Works Company of Burlington, Iowa, a catalogue of their engines, boilers and hoisting engines. It is stated that the semi-portable engine built by this firm has the great advantage of being independent of, and detached from, the boiler; consequently the bearings do not heat nor the working parts get out of line. The crank shaft bearings and cross head slides are cast of one solid piece with the column. The piston and valve rods are of steel, the shaft of hammered iron, all stuffing box glands are of best steam metal, every joint is made to take up the wear, and all parts are easy of access for adjustment and repair. The boiler is wholly of the best boiler steel—tensile strength 60,000. No cast iron head or other device to lessen cost of manufacture. It has three or more hand holes for convenient cleaning. It rests on a cast iron base, with large ash box underneath, and an air space between this and the floor to protect from fire. Each boiler is tested with cold water pressure at 150 pounds, and every engine is fired up and run before leaving the shop.

THE SHIPMAN ENGINE COMPANY of 200 Summer street, Boston, Mass., publish a catalogue of their automatic steam engines and steam launches. The 22 horse-power marine compound engine has cylinders 4½ x 9 inches, with stroke of 6 inches. The pistons can be filled with sectional self-adjusting packing rings, and the valves are of the balanced piston type. The engine is provided with the usual double eccentrics and link motions, and both the high and low pressure valve gears are operated by arms from a single shaft moved by the reverse lever. The crank shaft is of cast steel in a single piece. The cranks are provided with balance disks, which are filled with lead, and tend to counterbalance the piston and connections, thus admitting of a higher piston speed than is attainable in most engines, with little vibration. The shaft inside the standards is 27-16 inches diameter, and has four bearing boxes, babbitted. Outside of standards for shaft coupling it is 2½ inches diameter. All the principal working bearings are easily adjustable and of unusually large surface, particularly main journals, guides, wrists and crank pins. The cranks are set at an angle of 90°, thus avoiding dead centers. The engine is provided with sight feed oil cups and centrifugal crank oilers. The boiler is of the water tube type, of the same style as is usually furnished with the Boston model of the Shipman engine. It contains 256 1½-inch tubes, 18 inches long, and has two steam domes, from which the steam is drawn. Three fires are placed on each side of the boiler, and each set is controlled by an independent diaphragm. Steam can be generated from cold water in about ten minutes with this boiler. The vacuum and feed pumps are driven from the inside end of the crank shaft by a speed reducing worm gear, running the pumps at the rate of one for the pumps to four for the engine. By this arrangement the efficiency of the pumps is increased, and the noise consequent to high speed pumps is avoided. The engine occupies a floor space 18½ x 28½ inches and is 32½ inches high; the boiler is 34 x 38 inches and 43 inches high.

STEEL PLATE CHIMNEYS for blast furnaces, rolling mills and for all kinds of factories are described in a catalogue by the Philadelphia Engineering Works (Limited). It is stated that during an experience of 20 years not one of these chimneys

has failed in any particular. The pamphlet gives rules for calculating these chimneys, and also gives the dimensions of some of those erected by the company.

CATALOGUE No. 3, issued by the Riehle Bros. Testing Machine Company of Philadelphia, describes their United States standard testing machinery and appliances, their frictionless ball-bearing screw jacks, marble molding and countersinking machines, warehouse and railroad trucks and contractors' supplies.

J. WARREN COULSTON of 505 Chestnut street has published a pamphlet descriptive of and setting forth the advantages of the Edward C. Broadwell process for coating iron and other metals with aluminum and its alloys by dipping and without the use of electricity. After cleaning the article he treats it with a flux containing a haloid salt of tin or of tin and zinc. Then he dips it in aluminum or an alloy. This substitute for tin has been called "aluron."

WE HAVE RECEIVED from the Boiler Capsule & Gasket Company of Danbury, Conn., a pamphlet descriptive of the Saunders combination capsules and metal fish, intended for removing scale and preventing pitting in steam boilers. It is stated that these preparations will not only remove all incrustations, but will also keep the carbonate and sulphate of lime in a constant state of solution, so that they can be blown out with the force of the steam.

WE HAVE RECEIVED the 1898 catalogue from the Newton Machine Tool Works of Philadelphia describing the cold-saw cutting-off machines built by them. These machines are adapted to a wide range of work, cutting shapes and solid bars at any desired angle.

THE CHAS. MUNSON BELTING COMPANY of 22 Canal street, Chicago, have issued a catalogue in which they describe the method of manufacturing their belt and the advantages it possesses. They state that all belts should be made from pure oak tannage and of even thickness of stock. Under no consideration should a belt be "shammed" or built up to make it appear of even thickness, as it adds no strength to the belt and makes one more joint to get loose. The company state that they use only that part of the hide from the base of the spine to a point over the rear point of the shoulder blade, and down each side. No part of the shoulder is ever used, as it is of a looser and coarser nature and is liable to crack and break.

Lord Armstrong on Rams.

Lord Armstrong, the head of the great British shipbuilding firm which constructed the ill-fated battle ship "Victoria," is of the opinion that the building of such immense war vessels is a mistake. At the annual meeting of the Armstrong & Mitchell Company last week he said that the collision off Tripoli had taught a lesson that should be heeded. It furnished an unassailable argument against gigantic ironclads, which have absolutely no defense against the ram of an adversary. Lord Armstrong strongly advocated the building of several vessels specially designed for ramming, such as the United States ram "Katahdin," now being built at the Bath Iron Works after the design of Admiral Ammen. These vessels, he observed, should not be too large and should be kept free from the costly complications of battle ships. Personal dash on the part of the commander would be the principal quality needed in handling such a rammer. The occasional loss of such an inexpensive vessel would be of small importance as compared with the loss of a great battle ship like the "Victoria."

One outcome of the coal scarcity in England caused by the miners' strike has been a large increase in the use of gas and oil engines for power purposes.

THE WEEK.

For the first time for many months all the five Central American republics are in a state of peace and quietude at home and abroad. So gratifying is their present condition that proposals are said to be afoot for their federation.

The United States battle ship "Oregon," building at the Union Iron Works, San Francisco, will be launched on October 26. Preparations are being made for marking the occasion with considerable ceremony.

In a paper in the current issue of the *North American* Mayor Gilroy of New York estimates that the value of the city's property has grown from \$277,000,000 to \$559,000,000 since 1871.

As the result of a mill-to-mill canvass made last week in the textile districts of Philadelphia, by the *Press* of that city, it was found that of a total of 30,000 persons normally employed in 131 mills visited, only a few more than 6000 are at present at work. The total wage loss to unemployed textile workers in the Quaker City at the present time is estimated at nearly \$1,000,000 weekly, the mills canvassed comprising but one-sixth of the total number of textile establishments in the city.

The Hydrographic Office of the Navy has received information respecting 20 derelict vessels, wrecked during the hurricane of August, which have been seen along the Atlantic Coast from Maine to North Carolina, presenting a serious obstruction to navigation. Steps for removing the vessels are in contemplation.

Twenty-eight men were drowned on September 29 in the Mansfield Iron Mine in Michigan, through the waters of the Michigamme River breaking through their bed, weakened by the mining excavations below. The Mansfield Mine is situated about 6 miles from Crystal Falls, the capital of Iron County. It has been worked for four years, and has shipped about 660,000 tons of Bessemer ore. The mine is one of the few which have been worked continuously during the recent depression.

According to Commodore Ramsey, Chief of the United States Bureau of Navigation, the recent Columbian naval review, entailing the prolonged presence of many American war vessels in home waters, was responsible for an unusually large number of desertions from the navy. During the year ended September 30, 1259 men and boys deserted, of whom 1079 went ashore in the United States.

A proposal of the New York Dock Board to utilize the water front of Riverside Park for docks, wharves and elevators was defeated in a meeting called last Saturday to consider the plan.

The new Cunarder "Lucania," before leaving Liverpool on her second trip, had the pitch of her propellers altered to prevent the vibration experienced during her initial voyage. The alteration is reported to have been entirely successful in removing the defect.

The recent epidemic of train robberies has induced the managements of some Western railroads to arm their employees with rifles; and express companies will in future use additional precautions to protect the valuable property forwarded by them.

Advices from Cleveland, Ohio, report that freight rates on the lakes have at last reached a profitable basis, and many boats are coming out of ordinary. For the remainder of the season business is likely to be brisk with the better class of lake shipping. Ore tonnage commands 90 cents and \$1 a ton from Lake Superior ports, being about twice the rates of six weeks ago and very nearly up to the best level of last year.

Electric ambulances are to be introduced by the city authorities of St. Louis, the various street railways of the city having consented to allow them the free use of their tracks.

A Philadelphia safe deposit company are about to build a chain of warehouses on the Delaware River front of the city at a cost of \$1,000,000, which, it is said, will give Philadelphia the best storage facilities for merchandise of any city on the Atlantic Coast.

The following comparative table of the mercantile vessels of America and Great Britain is compiled from statistics presented at the recent Water Commerce Congress, at Chicago, by Thomas J. Vivian. The figures are taken from returns of the last census year, and deal only with steam and sailing vessels actually engaged in traffic:

Vessels.	United States.		Great Britain.	
	No.	Tonnage.	No.	Tonnage.
Engaged exclusively in foreign trade.....	686	636,691	5,988	6,596,445
Engaged in mixed foreign and domestic trade.....	601	527,664	760	185,058
Engaged exclusively in domestic trade.....	12,731	2,701,674	10,626	690,693
Totals	14,018	3,876,069	17,554	7,611,154

With the addition of unrigged craft the contingent engaged in the home trade of the United States rises to 23,293 craft, with a tonnage of 6,710,531, bringing her total tonnage up to less than 60,000 tons behind that of Great Britain, with 7025 craft in excess.

It is credibly reported that A. A. McLeod has secured a charter for a railroad line through the State of Connecticut, and that plans have been consummated for bringing the New York & New England road into the city of New York, thus establishing the shortest route between that point and Boston. Mr. McLeod has, it is said, the backing of such capitalists as Russell Sage and George J. Gould.

Mobile, Ala., was on Monday swept by a destructive storm, which raged over the whole of Southern Alabama. The business part of the city was reported as being 4 feet under water, several lives were lost and great damage to property was done.

The consideration of rapid transit proposals for the city of New York can only be compared in its slowness to the inaction of Senators at Washington on the Repeal bill. A decision in both cases is being loudly called for, while those who have the matter in hand go on their tardy way impassively.

A new weekly steamship service is about to be established between Philadelphia and Liverpool, by the Johnson Steamship Company of England in competition with the American line of steamers, which has maintained a service between the two ports for the past 20 years.

At the universal exhibition, previously mentioned, to be held in Madrid,

Spain, from April 1 to October 31, 1893, the exhibits will not be divided into nationalities, all goods of the same class being shown side by side. The charges for space will vary from \$14 50 per square meter (10½ square feet) to \$10. Special positions will be on a higher scale.

A sign of reviving business in the coal trade is seen in the announcement from Shenandoah, Pa., that the employees in all collieries operated by the Philadelphia & Reading Company have commenced working on full time, and will be paid 5 per cent. above the \$2.50 basis, the highest wages paid for many years.

Since the opening of navigation the Erie Canal has brought from Buffalo 34,400,000 bushels of grain, compared with 21,000,000 in 1892 and 24,000,000 in the previous year. The growing importance of the canal is evident from the fact that this year it is carrying about 40 per cent. of the grain traffic, where last year it carried but 25 per cent.

The Jamaica (W. I.) sugar crop is reported to be threatened with destruction by a new and baffling disease which has attacked the canes. Specimens of canes so diseased have been

sent to Europe for examination of experts.

Proposal to Consolidate British Coal Mines.

Sir George Elliott, the veteran English engineer, mine owner and contractor, who was himself at one time a lad in a coal pit, has proposed the formation of a great coal trust to operate all the British coal mines, and so to avoid in the future the trouble now existing in England from strikes among colliers. The plan does not contemplate a great union of capitalists and mine owners which will overawe the workmen, but it is to be an immense co-operative union, in the benefits of which the workmen are to share. Sir George's calculations are based on a capital of \$550,000,000 and a yearly production of 145,000,000 tons; the capital to be represented by 5 per cent. debentures and by ordinary stock, to be issued to present mine owners and lessees. In operation, after 5 per cent. has been paid on debenture shares and 10 per cent. on ordinary stock, the next 5 per cent. shall be divided among the workmen and shareholders. Profits beyond this will be divided among the lessees and workmen, and a purchasers' board of trade or reference will be appointed. The Lord Chief Justice of England, it is proposed, shall be intrusted with fixing the price of coal. The design may be somewhat Utopian, but it seems to be a condition toward which certain industries are drifting, and it certainly possesses commendable features which are conspicuously absent in most of the great trusts and combinations now existing on this side of the water.

The Iron Age

New York, Thursday, October 5, 1893.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - BUSINESS MANAGER.

The Western Iron Trade.

Reports of the resumption of operations by Western rolling mills and other manufacturing establishments are pleasantly numerous. Items of this character make much more cheerful reading than statements of works closing down and workmen being thrown out of employment. Enough of them have recently been published to give the public the impression that a marked revival has taken place in the iron trade. Writers for the daily press group a number of them together and thus brighten the general effect. Unintentionally a false impression is thus being created as to the actual condition of the business. The situation has not improved enough to cause those directly interested in the trade to experience much satisfaction. The best that can be said is that at last some business is presenting itself, and that the Western iron trade is not so absolutely stagnant as it was during almost the entire summer.

Looking over the field, and taking up the manufacturing centers of the West in detail, it will be found that the resumption of manufacturing activity is by no means general. Important establishments, that for years have been hives of industry, are still deserted by the workmen, who have no definite prospect of being called back to their dust-covered machines or benches. Manufacturing towns are still to be found in which hardly a wheel is turning, and no one there can tell whether anything better will be realized this winter. In some instances negotiations are now known to be pending between owners and workmen for the adoption of low scales of wages which may enable works to be started for almost the sole purpose of saving human beings from starvation this winter. There are no orders for the product in immediate sight, but efforts will be made to get them if the works can be run without loss to the owners. In quite a number of recent cases in which mills have been started there was no pressure whatever for the product, but the necessities of the idle workmen and their families appealed successfully to the sympathies of manufacturers and they are trying their best to provide employment.

The future is not entirely without hope. It is a great step forward to be able to say that the depth of the depression has been passed. The comparatively feeble efforts at resump-

tion of operations now being made by some works will help other branches of business. As all kinds of business are dependent on one another, it is to be expected that the recovery thus started will continue to grow and to widen its influence until in the course of time there will be experienced at least some resemblance to the prosperous times whose departure is so universally regretted. But when one looks around and sees hardly a bar mill at work in Ohio, very few mills doing anything in Indiana, and in Illinois and Wisconsin the great works of the Illinois Steel Company entirely shut down, he can hardly agree with those who glibly talk of the return of prosperity to the iron trade.

Belgium, so long one of the strongholds of puddled iron and of iron rolled from old material, is getting into shape for a lively competition in soft steel. Ed. de Laveleye contributes to the *Moniteur des Intérêts Matériels* an interesting technical review of recent developments of the equipment of steel plants and of their capacity for production. In 1892 the output of steel ingots was 260,000 tons, and that of rolled iron was 555,000 tons, representing about 600,000 tons of crude material. He figures that actually the output of steel is at the rate of 293,500 tons per annum now, that early in 1894 it will be at the rate of 458,000 tons a year, and that the possible capacity of old and new works is 962,000 tons per annum. The new works are those at Sclessin, of the Angleur Company, with three basic 12-ton converters; the plant of the Couillet Company, with four basic 10-ton converters, with rail and beam mill, and the plant of the Providence Company, with three basic 10-ton converters and rail and beam mill. This will carry the total number of converters up to 25, with 228 tons nominal capacity, to which must be added eight open-hearth furnaces with 85 tons nominal capacity. Here, then, there is equipment enough to displace all of the iron used by the Belgian trade, if such a displacement were possible. There will be the usual experience that a certain amount of puddled iron is called for, and that the old iron mills will struggle along by buying billets and slabs from the steel works. Belgium, therefore, will have an excessive capacity for production, and some of the older and weaker concerns will have to go through all the agonies of frightful competition which is only too familiar to American iron manufacturers.

Under the direction of the Mayor of Chicago an effort has just been made by the police of that city to ascertain how many persons are unemployed. They visited 2187 establishments and found an aggregate of 111,016 persons employed, as compared with 186,602 ordinarily employed. The difference between these two aggregates is 75,486, and this is assumed to represent the unemployed, although claims are

made by those who profess to be thoroughly informed on the subject that many establishments were not visited and that the number out of work is nearer 100,000. This is an appalling fact confronting the city authorities on the eve of winter. Cincinnati is in very much better shape than Chicago. A police canvass there shows but 4500 unemployed, and a liberal allowance for errors and omissions does not make the number over 6000. Citizens of St. Louis, however, claim that their city is in the best position of any of the Western trade centers, having no more unemployed than will always be the case in the best of times.

Holding Back Steel Specifications.

The merchant steel manufacturers are becoming somewhat concerned over the attitude of their customers. Implement makers have been later than usual in placing season contracts for steel, but these have been coming in so steadily for some time that mills making a specialty of such business are finding their order books very well filled. Specifications, however, are being sent in but slowly to the steel manufacturers, who are consequently making only small shipments on such contracts. They have assurances from their customers that the material ordered will be needed and have their arrangements made to fulfill their contracts. With the volume of business thus far placed the mills should even now be actively at work in order to insure prompt deliveries throughout the season. But still more contracts are in sight from some classes of consumers who purchase later in the year than the largest implement concerns, and the steel manufacturers must also take care of their customers. They are therefore anxious to receive specifications as rapidly as possible on the contracts already booked so that satisfactory deliveries can be made to all consumers of this character.

Unless a change is made very soon in the policy of the largest merchant steel consumers, they are likely to find their operations embarrassed for lack of material just at the time when they desire to push their manufacturing operations most actively. The merchant steel mills are always busiest from January until June. In previous years they have run on full time and full handed during the fall months, and yet found themselves pushed to make satisfactory deliveries when such orders were received after the turn of the year. If they run light for the next two or three months, as now seems probable, nine or ten months' work will have to be crowded into five. Large consumers should guard against inviting such a state of affairs, which will breed much annoyance to themselves as well as to the steel manufacturers.

The iron trade does not figure very well in the statistics of mercantile failures for the first nine months of the

current year, which have been compiled by *Bradstreet's*. The total liabilities of concerns which suspended were \$274,745,496 in the first nine months of 1893, as compared with \$26,161,414 in the same period of 1892. Of course, banks and bankers are the largest class, with \$155,256,759 and \$6,059,809 respectively. Then follow next in the list iron and steel manufacturers, of whom 31 failed this year, with aggregate liabilities of \$15,468,000, against nine with \$1,983,000 last year up to October 1. Dealers in hardware and metal add to this \$2,963,500 and \$312,000 respectively. Of all the mercantile failures the iron and steel manufacturers claim 8 per cent., so far as liabilities are concerned. Of course, it may be objected that the amount of liabilities is a treacherous guide, and that it does not admit of fair comparisons. It is well known that this year many concerns were driven to suspension which would have been perfectly solvent in ordinary times. Still, the reproach may be justified that too many of our iron manufacturers were too much extended.

The Tin Plate Report.

(From our Special Correspondent.)

WASHINGTON, D. C., October 3, 1893.

The following is a comprehensive synopsis of the quarterly report of Col. Ira Ayer, Special Agent to the Secretary of the Treasury. He says:

During the quarter ended June 30, 1893, 85 firms manufactured 39,543,587 pounds of tin and terne plates proper, against an output of 29,568,899 pounds by 38 firms during the previous quarter.

The amount of American sheet iron and steel made into articles and wares tinned or terne plated was 2,322,455 pounds, making aggregate output for quarter 41,866,042 pounds; of the tin and terne plates proper 18,264,225 pounds, or more than 46 per cent., and of the aggregate 20,586,680 pounds, or more than 49 per cent., were made of American black plates.

The total consumption of American plates during the present quarter, including products from American sheet iron and steel terne, was 14,102,299 pounds, showing an increased consumption of American plates during the last, as compared with the previous quarter, of 6,484,381 pounds, or an increase of about 46 per cent.

Of the commercial plates 20,748,427 pounds, more than half of the whole, were coated with tin, and of these 19,425,336 pounds, nearly 94 per cent., consisted of the class of plates weighing lighter than 63 pounds per 100 square feet; 18,795,160 pounds were terne coated, of which 18,115,741 pounds, or more than 96 per cent., belonged to the lighter class. Of the entire manufacture nearly 95 per cent. belonged to the lighter class of plates.

Two firms whose output for the quarter, chiefly from foreign plates, is understood to have been in excess of 2,000,000 pounds, declined to make a sworn statement to the Government and no account is taken of their manufactures in this report. They are the Burn Stamping & Mfg. Company of Chicago, Ill., and Saunders, Fielding & Bond, New York City.

The following is a comparative exhibit of commercial plates (tin and terne plates proper) for the fiscal years 1892 and 1893.

Production of Commercial Tin and Terne Plate in the United States.

Period of manufacture.	Amount made from—				Total Pounds.
	American black plate. Pounds.	Per cent. American	Foreign black plate. Pounds.	Per cent. foreign.	
Quarter ended—					
September 30, 1891.....	785,547	96.00	41,375	5.00	826,922
December 31, 1891.....	1,300,661	98.16	209,190	14.84	1,409,851
March 31, 1892.....	2,132,062	66.44	1,077,119	33.56	3,209,181
June 30, 1892.....	5,178,393	68.14	2,422,488	36.86	7,600,881
Total.....	9,396,663	68.12	4,350,166	31.88	13,746,829
Quarter ended—					
September 30, 1892.....	5,920,082	54.05	5,082,643	45.95	10,952,725
December 31, 1892.....	8,043,449	40.71	11,715,042	59.29	19,758,491
March 31, 1893.....	11,371,968	39.46	18,104,431	61.54	29,556,399
June 30, 1893.....	18,264,225	46.19	21,279,861	53.81	39,544,086
Total.....	43,599,724	43.68	56,210,477	56.32	99,810,202

The amount of American sheet iron and steel made into articles and wares tinned or terne plated during the two fiscal years was:

American Sheet Iron Wares Tinned or Terne Plated.

Quarter ended.	Pounds.
September 30, 1891.....	1,129,217
December 31, 1891.....	1,359,330
March 31, 1892.....	1,488,261
June 30, 1892.....	1,644,059

Total fiscal year ended June 30, 1892..... 5,620,867

Quarter ended.	Pounds.
September 30, 1892.....	1,276,932
December 31, 1892.....	2,472,963
March 31, 1893.....	2,730,831
June 30, 1893.....	2,322,455

Total fiscal year ended June 30, 1893..... 8,802,681

This makes the aggregate manufacture of tin and terne plates in the United States during the fiscal year ended June 30, 1892, 19,267,586 pounds, and during the fiscal year ended June 30, 1893, 108,621,895 pounds; the last-named amount being more than 8,000,000 pounds in excess of the estimated output for the year as shown by the previous reports.

The total American plates used in manufacture of fiscal year ending June 30, 1892, was 14,917,420 pounds, against 52,402,405 pounds during the last fiscal year. Of the commercial plates manufactured in the fiscal year ending June 30, 1892, 33 per cent., and in the last fiscal year ending June 30, 1893, 46 per cent., were tinned as distinguished from terne. During the fiscal year 1892, 90 per cent. of the output of commercial plates were of the class weighing lighter than 63 pounds per 100 square feet, and of 1893, 94 per cent.

The sworn statements of producers of black plates in the United States show:

American Production of Black Plates

Period of production.	Lighter than 63 pounds per 100 sq. feet.		63 pounds per 100 sq. feet and heavier.		Total.
	sq. feet.	Pounds.	sq. feet.	Pounds.	
Quarter ended:					
Sept. 30, 1892.....	4,821,180	4,202,277	9,023,457		
Dec. 31, 1892.....	8,575,541	5,444,675	14,020,216		
March 31, 1893.....	13,287,507	6,361,848	19,649,355		
June 30, 1893.....	14,206,192	6,730,321	20,936,513		
Total.....	40,892,420	22,739,121	63,661,541		

From these figures of the entire production of 63,661,541 pounds, 40,892,420 pounds, 64 per cent., were of the lighter class.

Of the tin and terne plate manufact.

ures of the year 52,402,405 pounds were American, or 83 per cent. of the entire black plate production of the country for the year.

Colonel Ayer's report of February 20, 1892, showed that one-third of the net importations lighter than 63 pounds per 100 square feet during the fiscal year ending June 30, 1892, was 79,307,939 pounds. The output of tin and terne plates proper of the lighter class during the fiscal year ended June 30, 1893, was 98,850,487 pounds, showing thereby an excess, under the former interpretation of the law, over and above what may be termed the one-third requirement, of 14,542,548 pounds. This is exclusive of the manufactures of American sheet iron and steel made into articles and wares tinned or terne plated.

The total production of commercial tin and terne plates from American black plates of the lighter class during the fiscal year was about 94 per cent. of the entire product.

or.....	Pounds.
Add products from American sheet iron and steel tinned or terne plated.....	40,983,741
Total.....	8,802,681

Total..... 49,796,422

The product from American plates during the fiscal year ended June 30, 1892, of the kind subject to comparison with net importations was about five-eighths of the amount necessary to enable manufacturers to meet the one-third requirement under the law, comparison being made with the net imports of the fiscal year ended June 30, 1892.

The report then gives some details of the quantity of tin plates and terne plates imported and entered for immediate consumption and of such as were imported on and after July 1, 1891, and were withdrawn from warehouse for consumption during the fiscal year ended June 30, 1893, and concludes:

From these figures it is seen that of the class of plates weighing lighter than 63 pounds per 100 square feet, there were:

Imports of Tin and Terne Plate:

	Pounds.
Total imports year ended June 30, 1893.....	594,224,047
Total exports year ended June 30, 1893.....	128,091,811

Net imports..... 466,132,236

One-third of which is..... 155,377,413

One-third of the net imports of the fiscal year ending June 30, 1892, was 79,307,939 pounds, or about one-half net imports last fiscal year. The aggregate of the entries for immediate consumption and of the withdrawal entries

for consumption of tin and terne plates was

	Pounds.
Domestic product.....	611,949,980
	108,621,883
Total.....	720,571,868

This would indicate that the entire consumption of the country during the fiscal year ended June 30, 1893 was 720,000,000 pounds, of which more than 15 per cent. was of American manufacture.

During the three fiscal years ended June 30, 1890, there were imported in the United States of tin and terne plates and taggers' tin an average of 678,000,000 pounds annually.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., October 3, 1893.

Engineer in Chief Melville, who is now serving under his second assignment as chief of the Bureau of Steam Engineering, United States Navy Department, is taking his annual official retrospect of the important work under his charge. He can look back over the past 12 months with not only a sense of personal gratification, but a consciousness that the Department has had ample return in great results from his retention at the head of the most important branch of modern naval design and construction.

In conversing with the correspondent of *The Iron Age* Engineer in Chief Melville said:

"During the past year we have lost none of the vantage ground gained in previous progress in marine engine building for vessels of war. That we have been making advances all the time if not contrasted by anything we have at home it is certainly gratifying to know that the English and French engine builders are watching us very closely, and, in fact, I have several letters of introduction now from experts on the other side desiring civilities to visiting specialists in marine machinery."

"In a few days the 'Montgomery,' 2000 tons, will be tried. Her engines are vertical triple expansion, and we expect of them 18½ knots an hour. The 'New York,' 8500 tons, made 21 knots, or about 24 miles. She is a twin screw ship with four engines, or two to each screw. Her performances were very satisfactory, but we expect to show greater results from the 'Columbia,' or one of the Pirates, as we call her. She is 7500 tons, with triple screw and three engines, one to each shaft. She is contracted for 21 knots, but we are counting on seeing her unreel 22 or 23 knots, which would give her a speed in ordinary miles of about 25½ or 26½ an hour. This will unquestionably be the quickest record of any ship of her size."

"One objection to the English system is they allow too little heating surface in their boilers. They allow as low as 1½ square feet of heating surface to the horse-power, when we allow 2½ and in no case less than 2 square feet for the same purpose."

"The engines designed in the bureau have not only always done their work, but have, as a rule, exceeded the contract requirements. Of course now we are crowding the highest possible limit of speed, but we shall still make advances."

"The improvements in the future will not be so much an increase in the rate of speed as in the application of mechanical appliances to produce the same amount of speed by improved and enduring methods. The development

of great power by the simplest mechanical arrangements is, of course, the best."

"In the early days of marine, and, in fact, any kind of engines, increased power was associated with increased size, and, of course, increased weight. According to the designs of marine engines of, say, 30 years ago, to accomplish the high power and great speed we turn out for our war ships to-day the engines would have to be so enormous that the ships would not be large enough to carry them and leave room for ordnance and equipment. In fact, an engine under old plans could not be constructed to reach the speed attained to-day, even for a spurt, and certainly could not hold it. So we have made that much advance. A 21-knot engine of to-day will not take up as much room as a 12-knot engine of 30 years ago. And we have not yet condensed in the matter of space as much as we think we can, and intend to try. The achievements in the future will be the perfection of what we have accomplished, with, of course, some greater triumphs in speed. But I have said there is a physical limit to speed. Of course that could hardly be said of theory, but the resistance of natural forces in practice reduces theories to subjection to natural forces. We do not want to claim 50 knots when 25 might be the outside limit."

"The designs of the machinery for the new gunboats are not radically different from those in vogue in the previous work of the bureau, but they will possess some novel features which will interest the engineering world. One objection to our high power engines has been lack of economy when working at low powers, the complaint being that while admirably adapted for economical application to forced draft they were too large for ordinary cruising speed."

"In one sense that is a reasonable point, but it must be remembered that engines, as in matters of ordnance or hulls, must be constructed for the accomplishment of the very best results under the test of actual war and not on the lowest results in time of peace. It might be answered to this that a modern battle ship might be rigged in the sails for cruising purposes, but where would she be in time of action?"

"Still, we will meet this objection by minimum expense on forced draft or low power. The 'New York,' and, I may add, the 'Brooklyn,' have been engined with two independent triple expansion engines on the same shaft. The after engine of each shaft would drive the ship at one-half full power, while the other engine on the same shaft is not in use. This, we think, will cover this objection in vessels of this class for cruising purposes. The rule, however, will not work so well in small ships."

"In the 'Columbia' and 'Minneapolis' an equally effective arrangement has been introduced for an economical propulsion of the ships at low power. These vessels have three screws and three engines. These can be disconnected, so by using the central shaft the two side engines are at rest."

"But we have even another plan in the 'Maine.' Here the low pressure cylinders are forward and can be disconnected when working at low power, making the engines compound, the pressure corresponding accordingly."

"This is the principle applied to the engines on the gunboats. The engines in this case are quadruple expansion with 250 pounds steam pressure working at full power. For cruising purposes it will be triple expansion with steam at 160 pounds pressure. There are two

sets of boilers, four tubulous, carrying 250 pounds, and two cylindrical, 160 pounds pressure."

"I will mention particularly that here is where the novelty comes in. All these boilers can be utilized at full power. The coil boilers give their steam to the high pressure cylinders direct, but the cylindrical boilers deliver their steam to the first receiver. Here it meets the exhaust steam from the high pressure cylinders at 160 pounds. The cylindrical boilers with the triple expansion will answer for cruising, but the coils can also be used independently. I might say that the twin screws, each with its own engine, cylinders 11, 16, 24, and 30-inch stroke, will give 1760 horse-power at 300 revolutions, yielding 14 knots. Cruising speed would be 8 knots at 160 revolutions. The disconnection of the low pressure cylinders is by coupling fitted on the crank shaft between these cylinders."

"It is to be hoped," said Engineer in Chief Melville, "that this Congress will add a few more large and small class ships to those now building. The bureau is, of course, always working out new theories and methods as applied to engines specially adapted to our new ships. We are now abreast of the most advanced maritime nations in all that constitutes a first-class vessel of war of any class, but that does not satisfy the restless American spirit; we must be in the lead. I am sure that will not be difficult to accomplish with the start we have made."

New Publications.

THE PHOSPHATE INDUSTRY OF THE UNITED STATES. Sixth Special Report of the Commissioner of Labor. By Carroll D. Wright. Washington, 1893.

Toward the close of the year 1890 a resolution was passed in the Senate directing the Commissioner of Labor to examine and report the extent of the phosphate industry of the United States, the number of laborers employed and the opportunities for the employment of labor in the future development of the phosphate deposits. In accordance with these instructions Carroll D. Wright instructed Capt. James F. Tucker to collect statistics and prepare a report, in which he had the assistance of a number of other employees of the Department. The delay in the publication of the report made it possible to cover more fully the grounds, particularly so far as the Florida phosphate industry was concerned. The latter has passed through the boom period and has now settled down to the quiet methods of a well established industry. The report gives in detail maps and sections of the Florida phosphate belts, a number of which are clearly recognized. The report is accompanied by a large number of half-tone engravings from photographs. There is no original descriptive work, so far as the phosphate industry of South Carolina is concerned, since that ground has been thoroughly covered before. The statistics of the phosphate industry are collected in the third chapter, in which Mr. Wright has pursued his well-known methods of arriving at cost of production. In this manner he has analyzed the costs of 71 land mines in Florida, which show that the average on an output of 279,499 tons was \$2654. Similarly the cost of 22 land mines in South Carolina, which yielded in the aggregate 391,576 tons, was \$3497. Similar data are given for river mines both in Florida and South Carolina.

MANUFACTURING.

Iron and Steel.

The Union Rolling Mill Company of Cleveland, Ohio, recently made a proposition to their employees to resume operations on the basis of the Amalgamated Association scale, but without signing it, the firm being unwilling, in view of the uncertain outlook, to bind themselves to a given wage basis for one year. The men refused to accept the proposition.

The Brier Hill Iron & Coal Company of Youngstown, Ohio, have under consideration the blowing out of their one active blast furnace at that place.

Sarah Furnace of the Kelly Nail & Iron Company, at Ironton, Ohio, resumed operations last week.

Copies of the following notice have been posted at the Homestead Steel Works, Homestead, Pa.: "In accordance with the condition in the agreement governing the wage scale for these works, notice is hereby given that the company desire to readjust the scale of all departments, to take effect January 1, 1894." Under the terms of the wage scale in operation at the above plant, it is necessary for either side to give three months' notice before the terms of the scale can be changed. It is understood that material reductions in wages will be made at this plant.

The Ewald Iron Company of St. Louis, Mo., operating the Tennessee Rolling Works, at Tennessee Rolling Works, Ky., and the Tennessee Rolling Mills, at Louisville, Ky., signed the Amalgamated Association scale last week.

At Pittsburgh last week Judge Ewing, in the case of the American Tube & Iron Company against the Baden Gas Company, dismissed the exceptions to the supplemental report of the master. The master recommended that certain stockholders be required to pay a deficit of \$261,000 in the \$500,000 capital stock, which they had bought below par. Exceptions were taken because it was held that the stock had been fully paid for. The court says the evidence shows that the exchange of checks and receipts, by which it was pretended to pay for the \$500,000 worth of stock in cash, was a sham.

The Cold Rolled Steel Company of Pittsburgh, with work at New Kensington, Pa., went into the hands of a receiver last week.

The Atlantic Iron & Steel Company of New Castle, Pa., have been granted a charter, with a capital stock of \$350,000, the incorporators being Edward N. Ohl, A. W. Thompson, P. L. Kimberly and others. It is stated that the taking out of a charter by this new concern is but the first step in the direction of consolidating the interests of P. L. Kimberly and others, located in Sharon, New Castle and Greenville, with main offices at New Castle, Pa.

The property of the Columbia Iron & Steel Company, with works at Uniontown, Pa., and general offices at Pittsburgh, was levied on by the sheriff on September 28. The judgments on which execution is issued are held by Robert Hoggett and the People's Bank of Uniontown, Pa. The Hoggett judgment is for \$110,076 and interest from September 27, 1893. The other is for \$5000 with interest from 1894. The commission on both judgments amounts to \$3452.30, making the total of the two judgments \$118,528.30. The following liens and mortgages on the plant are held: John Huckenstein of Pittsburgh, mechanic's lien for \$10,000, with \$15,000 in first mortgage bonds and \$300,000 in second mortgage bonds held by Pittsburgh iron men. The indebtedness of the firm is \$578,538.30. As yet no date has been set for a sale of the plant.

All the mills of Wallace, Banfield & Co., Limited, at Ironton, Ohio, manufacturers of tin andterne plate and iron and steel sheets, have been running full for two weeks past. The firm have had six tinning stacks in operation and will put on additional ones during this week. They are a little behind in orders for immediate shipment, but have very few orders booked for late delivery.

The plant of the LaBelle Iron Works, at Wheeling, W. Va., manufacturers of steel nails and muck iron, is running full in all departments on terms that are entirely satisfactory to the firm and also to the employees.

During last week the Bellaire Nail Works, Bellaire, Ohio, put in operation a mill for

rolling sheet bars, and it is expected to keep this mill in continuous operation. The steel plant of this firm was started up the latter part of August, and with the exception of one week has been in continuous operation. It is hardly likely, however, that the firm will be able to run their steel department full time, but they expect to get sufficient business to run at least a portion of each week.

The National Tube Works Company, McKeesport, Pa., have declared a regular quarterly dividend of 1½ per cent. on the preferred stock, payable October 2.

At Pittsburgh last week an order was made allowing H. W. Oliver, receiver of the Linden Steel Company, to make an arrangement with the creditors of that concern to pay 20 per cent. of their indebtedness within a year and 10 per cent. of the balance every six months until the whole amount is paid. In his petition Mr. Oliver stated that the Oliver Iron & Steel Company are a creditor of the Linden Steel Company to the extent of \$1612.58, and he was satisfied that the assets of the Linden Steel Company are sufficient to pay their full indebtedness if done in this way.

The Laughlin Nail Company of Wheeling, W. Va., whose nail factory is located at Martin's Ferry, Ohio, have arranged a wage scale with their employees, and their nail factory, containing 226 nail machines, has been put in operation on fulltime. The nail factory of this concern is the largest in the country.

The annual meeting of the stockholders of the American Tin Plate Company was held September 27, at the office of the company, Ellwood, Ind., the following stockholders being present: Col. A. L. Conger, Akron, Ohio; E. F. Latham, Pittsburgh, Pa.; E. M. Bloomfield, Peru, Ind.; I. L. Morris, Chicago, Ill.; J. L. Morris, Boston, Mass.; E. M. Stanford, Atlanta, Ind.; J. F. Hazen, Cincinnati, Ohio; J. Lee Yarman, Richmond, Ind.; M. P. Hutton, Richmond, Ind.; W. B. Leeds, Richmond, Ind.; W. Hollingsworth, Richmond, Ind.; D. G. Reid, Richmond, Ind. The report of the past fiscal year was very satisfactory. The company have succeeded in obtaining a good reputation for their American brand of tin plates and have plenty of orders on their books at present. A dividend of \$2 per share was declared, and it was decided not to extend the size of the plant at present in view of the unsettled condition of tariff legislation and other matters. Following is a list of officers elected: President, Col. A. L. Conger; vice-president, John F. Hazen; treasurer, W. B. Leeds; secretary, D. G. Reid. These gentlemen also comprise the directorate.

Lucy Furnace, at Glendon, Pa., operated under lease by the Bethlehem Iron Company, has been blown out.

At Lebanon, Pa., the West End Rolling Mills have shut down indefinitely, as have also the 12-inch mill and the puddling department of the Pennsylvania Bolt & Nut Works.

J. J. Hudson of Philadelphia has bought at sheriff's sale the real estate of the Crum Creek Iron & Steel Company, and the equipment of the works at Crum Lynne, Pa., for \$1050, subject to a mortgage of \$16,000. The product of the plant was muck bar, bar iron and skelp iron, the annual capacity being 5000 net tons.

During their idleness the two furnaces of the Ashland Coal & Iron Railway Company, at Ashland, Ky., will be generally overhauled and repaired and put in first-class condition.

Hubbard Furnace of Andrews & Hitchcock, Hubbard, Ohio, is preparing to blow in after an idleness of some months.

The Brown, Bonnell Iron Company of Youngstown, Ohio, banked their Phoenix Furnace on September 30.

Mingo Furnace of the Junction Iron Company, at Mingo Junction, Ohio, has blown in.

The Woodward Iron Company of Woodward, Ala., will blow in one of their furnaces on October 10, when certain of their mines will also resume operations. One of the furnaces has recently been relined and the other is now undergoing relining.

The Homestead Steel Works, at Homestead, Pa., are being operated on orders required, or about half capacity. This week the 10, 23, 28, 32 and 119 inch mills will go on double turn. The open hearth and armor plate mills will also run full. Several of these have been on single turn. The 33-inch mill will remain closed. The 35 and 41 inch

mills, which were on single turn, will be closed this week, but will go on next week.

The H. Lloyd Son's Company, Incorporated, proprietors of the Kensington Iron Works, at Pittsburgh, signed the Amalgamated Association scale last week. Their plant resumed operations to nearly full capacity on Monday, the 2d inst.

The long contemplated hot metal route between the Edgar Thomson blast furnace at Bessemer, Pa., and the Homestead Steel Works at Homestead, Pa., has been completed, the first consignment of hot metal having been sent over it last week. The introduction of this new method of transferring metal will do away with the services of a large number of men.

At Pittsburgh last week an order was made upon the petition of H. W. Oliver allowing an agreement to be made between the Oliver Iron & Steel Company, as lessees of the Rosena furnace, at New Castle, Pa., and M. A. Hanna & Co., of Cleveland, Ohio, for the operation of the Furnace. The furnace has been standing idle since the insolvency of the Oliver Iron & Steel Company. The output of the furnace will be used at the mills on the South Side, Pittsburgh.

The Portage Iron Company, Limited, of Duncannonville, Pa., shut down on Saturday, September 30, the announcement being made that in future the mill will not pay, as heretofore, Amalgamated prices. We understand that a scale is being formulated based on the average of wages paid in Eastern Pennsylvania, and that this scale is to regulate wages as soon as work is resumed. The latter will depend upon the acceptance by the men of the new scale.

The Duncannon Iron Company of Duncannon, Pa., have reduced wages 10 per cent.

The steel plant and tube works of the Riverside Iron Company, at Benwood, W. Va., have resumed operations, employing 1000 men. A reduction in wages was made. Preference was given to American labor, the foreigners who participated in the recent riots at the works being refused employment.

Part of the tube works of the Reading Iron Company, at Reading, Pa., have resumed.

Lack of immediate orders has caused the American Sheet Mill at Phillipsburg, N. J., to shut down.

An agreement has been reached between the Union Rolling Mill Company, Cleveland, Ohio, and the Amalgamated Association, whereby the company agree to recognize the association. A scale has been signed and operations commenced; 400 men are employed.

The wire drawing department of the Salem Wire Nail Company, Salem, Ohio, has been closed down pending a settlement of the dispute in regard to a reduction of 10 per cent. in wages, of which notice was given by the company. If the men refuse to work at the reduction it is probable that all the wire used at this concern will be drawn at Cleveland.

The prospect of a conference between Mahoning Valley iron manufacturers and representatives of the two associations of workmen is now said to be very remote. Such is the publicly expressed opinion of leading men on each side.

The lining of one of the furnaces of the Thomas Iron Company, at Hokendauqua, has fallen in, necessitating blowing out.

Machinery.

The Columbia Spring Company, who were formed last year by combining the interests of a number of the principal spring companies in this country, have elected Wm. G. Park of Park, Brother & Co., Limited, of Pittsburgh, treasurer, to succeed Daniel J. Cough of Canton, Ohio.

According to the Dover, N. H., Republican, the Swamscott Machine Company of South Newmarket, N. H., have gone into the hands of receivers. The assets of the company are stated to be largely in excess of the liabilities.

The New Process Twist Drill Company of Taunton, Mass., are working only three days a week at present.

The Clark Foundry & Machine Works, which were recently destroyed by fire at Knoxville, Tenn., are to be rebuilt at a cost of \$30,000.

The foundry and machine shops of George Simon, at New Iberia, La., have been destroyed by fire at a loss of \$25,000; insured for \$11,400.

The court has ordered the sale of the machinery and stock in trade of the St. John (N. B.) Nut & Bolt Works Company, in liquidation. The property will be sold subject to existing incumbrances, amounting to about \$12,000.

A Worcester, Mass., newspaper has made a census of the industrial establishments of that usually busy town, and reports that manufacturers of machines and machinists' tools see little ahead to lead them to hope for better business, and are, most of them, looking forward to a dull winter. In many of the shops operations are entirely suspended and those that are running for the purpose of turning out small orders have not started with any assurance that they will not have to shut down again.

The Gibson Iron Works of Gibson City, Ill., have been incorporated, with a capital of \$50,000.

H. H. Harvey, granite tool manufacturer, Augusta, Maine, has rebuilt all the buildings in the plant destroyed by fire last December and is running again. He is now breaking ground for an addition to his main shop, 36 x 40 feet, two stories, and also for one new building, 30 x 80 feet, one story. He also contemplates building a foundry, 60 x 40 feet.

The works of the National Iron & Wire Company, and part of the Vulcan Brass Company's plant, at Cleveland, Ohio, have been burned. The loss is placed at \$45,000, partly insured.

William Stormont's foundry and machine shop at Ottawa, Ill., have been burned. The loss is about \$15,000, chiefly on patterns, tools and machinery.

The Globe Gas Engine Company of Philadelphia are now to be found at 51 North Seventh street in that city, where they will have a line of their engines on exhibition.

Riehle Bros. Testing Machine Company, Philadelphia, report the following recent orders: 20,000-pound horizontal testing machine, 10,000-pound vertical screw power testing machine, canvas testing machine for the United States Government, warehouse and railroad trucks for export, 3000-pound transverse testing machine, 1000-pound cement testing machine with worm gear, Star cement testing machine, 40,000-pound screw power testing machine, two 1000-pound cement testing machines, 100,000-pound testing machine, six 20-ton Riehle-Robie protected ball bearing screw jacks.

The Tiffin Agricultural Works, at Tiffin, Ohio, have gone into the hands of a receiver, Chas. J. Yingling being appointed. It is stated that the firm have a large amount of manufactured stock on hand which they could not turn into money, but are otherwise in sound condition. The works of the firm have again been put in operation under the management of the receiver.

The Fisher Foundry & Machine Company of the South Side, Pittsburgh, have received an order from the National Galvanizing Company for a traveling crane, including columns and girders for a trackway 250 long. The same firm are also furnishing to Shoemaker & Co. of Pittsburgh a special hydraulic charging crane and to the Suburban Street Railway Company a 300 horse-power automatic engine, making in all about 900 horse-power furnished to this concern.

In a few days the new building of the Interchangeable Tool Company, at Utica, N. Y., will be ready to receive the machinery and the plant will probably be in running order. The building is 225 feet long and divided into three departments. The rear portion is the drop room, in which the forgings and rough work will be done, while in one corner of this department will be a brick storeroom for the finished product. The drop room is 70 x 50 feet. The central room is 100 x 36 feet, and all the tempering and finishing will be done here. The front portion, facing the canal, is two stories high and contains the offices. The machinery for the plant has been supplied from Boonton, N. J.

The bids for water works' pumps for Portsmouth, Ohio, were opened two weeks ago and were as follows: E. P. Allis & Co., Milwaukee, \$15,000; Wilson, Snyder & Co., Pittsburgh, \$16,000; Hughes Pump Company, Cleveland, \$17,900; Laidlaw-Dunn-Gordon Company, Cincinnati, \$19,300. The trustees and their engineer visited a number of cities where the builders had pumps in operation, and, after a thorough investigation they met on the 27th ult. and unanimously awarded the contract to the Laidlaw-Dunn-Gordon Company of Cincinnati, at their bid of \$19,300.

Hardware.

Pullman Sash Balance Company, Rochester, N. Y., advise us that they have just received an order from Amsterdam for 300 sets of their new steel frame balances. Also one from London for 500 sets. The company state that they have not been shut down for one day during the recent depression and have been running full time.

Bridgeport Chain Company, Bridgeport, Conn., are working nine hours per day and five days a week, employing a large proportion of their force.

Bridgeport Gun Implement Company, Bridgeport, Conn., are working ten hours per day and six days a week, and are employing almost their entire regular force.

H. B. Todd, manufacturer of tools and hardware, Meriden, Conn., has disposed of his business to S. Walter and Arthur W. Proudman. Mr. Todd's reason for selling out his business is understood to be his ill health. In about a month Mr. Todd will leave for Avon Park, Fla., where he will engage in the business of raising fruit.

The Goodell Company, Antrim, N. H., are running four days a week.

Ellwood Ivins Tube Company, Oak Lane, Pa., a suburb of Philadelphia, have added to their plant a new mill 60 x 150 feet, and installed machinery for producing a high grade of seamless tubing, drawn from steel, copper, brass, aluminum, aluminum bronze, silver, gold, platinum, German silver, as well as various compositions brought to them by manufacturers. A feature of this enterprise is the drawing of seamless tubes from aluminum bronze, which, according to Richards, has 44 times the rigidity of brass and three times that of gun bronze, with a tensile strain equal to that of low steel and a heat conductivity nearly as great as copper. They will draw tubes of diameters from 1-64 inch to 5 inches, and claim to produce the tubes of an evenness expressed by a maximum variation of not to exceed half of 1-1000 inch. Samples of steel tubing about the size of a human hair are shown, the hole in which can only be seen with a powerful glass. Tubes tapering from the middle toward both ends, tapered both inside and outside, smooth and true to gauge, are also shown.

W. W. Cross & Co., Brockton, Mass., will at once begin the erection of a new tack factory on the site of the one recently destroyed by fire. It will be of brick, 160 x 35 feet, and one story high.

Fred. Nourse Company, 315-319 East Twenty-second street, New York, makers of metal springs, have commenced the manufacture of coil springs with chains and swivels under contract with F. B. Schultz & Co., who are about to inaugurate the production of jointed dolls in this country, heretofore made almost exclusively abroad. These springs will supersede the well-known rubber device, which so soon ceases to be of service, and will permit of movable joints of arms, legs and head.

The Iowa Farming Tool Company, Fort Madison, Iowa, have increased the capacity of their works, also their facilities for storing manufactured goods. Two shops have been added to their plant, with machinery to increase their fork output more than 50 per cent. Another hoe mill has also been built, doubling their hoe product, and a 250 horse-power Corliss engine has been added to their power. Their storage capacity has been increased by a warehouse with 30,000 feet of floor surface, from which they can load four cars at once. These improvements, it is remarked, enable them to produce and carry in stock a larger quantity of goods, and thus fill orders promptly.

The Yale & Towne Mfg. Company have about completed a number of special designs, which have been accepted by the architect, in builders' hardware to be gold plated and used in trimming the house of C. P. Huntington on Fifth avenue, near the Park, now in course of erection by Geo. B. Post. Mr. Huntington will be remembered best in connection with his large railroad and steamship interests, as well as being the senior partner of Huntington-Hopkins Company of New York, San Francisco and Sacramento.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have just completed a number of contracts for outside and inside decoration. Prominent among them may be noted a large wire fence of pleasing design for the Anheuser-Busch Brewing Company, St. Louis; artistic stable fittings for two large livery stables in St. Louis; elevator inclosure for the Polytechnic Building, St. Louis,

this latter work being of pressed work, with hammered iron leaf work, and a large number of heavy window guards for the Insane Asylum at Fulton, Mo.

The mill of the Salem Wire Nail Company, Findlay, Ohio, has resumed operations, with the exception of the wire drawing department, which will remain idle indefinitely. The men in the nail department of the plant have agreed to go to work at the 10 per cent. reduction proposed. The wire drawers have refused to accept the 10 per cent. reduction offered them, and Cleveland workmen will be employed in their places.

A reduction of 20 per cent. in wages went into effect at the works of the Wiley & Russell Mfg. Company, Greenfield, Mass., on Monday, October 2. This reduction affects all but one department, in which there will be but 30 working hours per week. The reduction affects some 300 men. It is stated that the business depression is responsible for the cut. No trouble is anticipated from the men.

The Kelly Axe Mfg. Company, Louisville, Ky., have signed a contract to remove their entire plant to Alexandria, 10 miles north of Anderson, Ind. The company will begin operations at Alexandria with a large force of skilled mechanics. The work of removal will begin at once.

The works of the Columbian Pump & Machine Works, Columbiana, Ohio, have resumed operations after a shut down of about four weeks. Forty-five men are at present employed. The company recently purchased 2 acres of ground upon which it is proposed to erect additional buildings in the near future.

The American Axe & Tool Company's works at Ballston Spa, N. Y., were started on October 2 on full time.

The business of the George R. Bidwell Cycle Company, 306 to 310 West Fifty-ninth street, New York, is being continued as usual under the supervision of Theron G. Strong, receiver, and it is confidently expected that before long the affairs of the company will again be in good shape.

Miscellaneous.

Salem Foundry & Machine Shop, Salem, Mass., and 67 Chauncy street, Boston, Mass., well known builders of elevators, have taken the exclusive agency for the State of Massachusetts for Standard Smoke Consumer Company's apparatus for consuming smoke, which may be attached to any boiler without reconstruction.

The Western Railway Signal Company of Pittsburgh have been granted a charter of incorporation, with a capital stock of \$50,000, for the purpose of engaging in the manufacture of railway danger signals. The incorporators are: John C. Bennett, John N. Shepard and W. H. Brown, all of Pittsburgh.

The Toledo Bridge Company of Toledo, Ohio, have commenced the erection of an addition to their plant 90 x 250 feet in size, which will be equipped with machinery for turning out structural iron work.

A committee has been appointed by the creditors of the Gilbert Car Company of Green Island, N. Y., to devise some plan for the reorganization of the company, so that operations at the works may be resumed. The committee favor the organization of a stock company to operate the works, such a company to include as stockholders the principal creditors.

The Automatic Wind Motor Company have been incorporated at Albany, N. Y., to manufacture wind motors, pumps and pumping appliances and electrical machinery to be used in connection with such motors. The offices will be at Bladell, Erie County. The company are capitalized at \$100,000.

The paint, freight and passenger car shops of the Valley Route, at Vicksburg, Miss., have been burned, at an estimated loss of \$150,000.

The New Jersey Art Metal Company have been incorporated in New Jersey, with a capital stock of \$20,000, for the purpose of manufacturing fancy metal articles of every description at Passaic.

The Portland Automatic Scale Company, capitalized at \$60,000, have been organized at Portland, Maine, for the purpose of manufacturing, buying and selling all kinds of weighing and measuring machines.

The Alabama Pipe Works, at Bessemer, Ala., have resumed operations with a full force of hands.

The Baldwin Locomotive Works of Philadelphia, which six months ago employed 5000 men, have reduced their force to 3500 men, none of whom work more than eight hours per day for five days in the week. Between 700 and 800 men were laid off one week recently, and it is not improbable that a still further reduction in force will take place, as very few new orders are being received, and the outlook for business in the near future is anything but promising.

The town of New London, Conn., is seriously wrought up over the question of the removal of the Bath Iron Works from Bath, Maine, to New London. It is estimated that it would require a cash expenditure of \$200,000 on the part of the Connecticut town to secure the plum, but it is argued that the benefits accruing to the town would more than compensate for such an outlay.

A license to incorporate has been granted to the following: The Chilled Gear Wheel Mfg. Company, at Chicago; capital stock, \$250,000; for the manufacture of chilled gear wheels and electrical supplies; incorporators, Ed. A. Rohrkaste, W. H. Hamilton and Carvell Gough. Standard Smokeless Furnace Company, at East St. Louis; capital stock, \$150,000; for the manufacture of furnaces, stokers, regulators and contrivances for the consumption of smoke and the economizing of labor; incorporators, Percy B. Weston, W. B. Farr and Oscar Goosberg. Acme Track Jack Company, at Chicago; capital stock, \$60,000; for the manufacture of railway appliances; incorporators, James J. Barkley, Holman Anderson and Robert A. Wilkerson. Davy Steam Sewer, Ditching & Mfg. Company, at Chicago; capital stock, \$250,000; for the manufacture of ditching machines and the construction of sewers; incorporators, John Dierk, William Davy and E. J. Davy. Bipower Car Motor Company, at Chicago; capital stock, \$1,000,000; for the construction of cars and motors; incorporators, Harver Spark, Oscar W. Bond and Samuel E. Hibben.

The Alpena Industrial Works, at Alpena, Mich., had a fire in their foundry recently and lost patterns to the value of \$7000, insured for \$5000.

A press dispatch from Louisville, Ky., under date of October 3, says that Thurman & Powell, machinists and foundrymen, of that city, have made an assignment. Liabilities, \$36,436; assets, \$31,401.

How low prices have gone in Germany is shown by a recent report from Dusseldorf. Steel blooms have been offered there at 65 marks per metric ton, or \$16.12 per gross ton. The works in the Saar district offer to deliver at the same rate, although they must pay a 12 mark rate of freight. To them, therefore, this price is equivalent to \$18.15 at mill for blooms.

It has been recently stated by representative persons in Youngstown that a scale of wages for rolling mill work that would satisfy both sides in Pittsburgh would not be satisfactory in the Youngstown district for the reason that there is much more puddling done in the Mahoning Valley than around Pittsburgh, where steel is mostly used. President Garland of the Amalgamated Association takes exception to this statement and supports his opinion by referring to the immense tonnage of puddled iron at Byers', Zug's, Painters' and numerous other mills.

The announcement is made in press dispatches that the rail mill of the Lackawanna Iron & Steel Company, at Scranton, Pa., has started up. While this statement is correct it is inadequate and is characteristically misleading. The mill has started up to roll orders for less than 500 tons in the aggregate, or just one day's work, single turn, running slowly. The management are following this general plan of starting up on small orders, although it is costly, in order to give their men a chance to earn some money, however small the amount may be.

TRADE REPORT

The feeling of discouragement is spreading in the Iron trade. An increasing number of manufacturers and merchants are shaping their business on the conviction that the balance of the year will not bring out enough business to give mills and furnaces adequate employment and thus lay the foundation for a recovery in prices.

The great majority of the rolling mills throughout the country who are attempting to run are working spasmodically. This means relatively high cost of production, which they aim to correct by securing more work. So many are trying that plan now that prices are in the demoralized condition characteristic of nearly all the markets. Too many makers have been too sanguine and are now paying the penalty for what seemed to be some weeks since a justifiable view of the situation.

A good many men in the Iron trade have been inclined to charge the delay in the repeal of the Silver bill with the greater part of the responsibility for the depression. Their views seem to be undergoing a change. We often hear the opinion expressed now that little improvement will follow even a straight out repeal. Even if that opinion is incorrect it will take an accumulation of evidence before it is abandoned. That, again, means delay in the return to confidence and to buying in the Iron trade.

It is acknowledged now that Soft Steel Billets have sold at \$18 in Pittsburgh, and there is a good deal of speculation whether such a low price can be reached by *bona fide* figures as to cost. The boast of a leading manufacturer that he can go down to \$16 would be more disturbing if it were not generally received skeptically.

The renewals of maturing obligations, which may have caused some distress lately, and are responsible for some despondency, do not appear to have crowded any important concern in the Iron trade to the wall. Still, some disquieting rumors have been afloat.

During the week there have been no reports of offerings of material by those who had made advances on it, so that that disturbing element which has been most conspicuous in the Pig Iron trade is now absent. Instead, there are indications, notably in Chicago and Cincinnati, that consumers have so far cleaned up their stocks that they are forced to become more liberal purchasers.

In Finished Iron and Steel Pittsburgh is still the cyclone breeder so far as prices are concerned, with other districts following as well as they can.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., October 3, 1898.

There is nothing in the market that can be regarded as an improvement on last week's business. Prices are weak, but not materially lower, simply because there is no demand to make it an inducement to accept lower figures. Business is confined to the smallest quantities that buyers can get along with, hence it is not worth while making new prices on small lots. On large orders, however, there is nothing that could not be bought at lower figures than holders are supposed to be getting; all that is necessary is the right kind of a buyer and a firm offer, but these are scarce, otherwise there would be a firmer market. For the present there is nothing in the outlook to indicate any material change, and the trade is settling down to the conviction that while the last quarter of the year must be an improvement on the one preceding, it is very doubtful if it will come anywhere near to the first two quarters.

Pig Iron.—The movement is very slow, low prices being no inducement to those who are not in need of material. The output is supposed to be in fairly close proportion to consumption, but the accumulations of earlier months are an insurmountable barrier to an improving market, so that until these are absorbed prices are likely to remain weak and unsettled. It is not so much a question of price as it is to find those who need Iron. Those not needing it cannot be persuaded to buy at any price. If they do not need it they won't buy, no matter what the price may be. This, of course, cannot continue indefinitely, and at about the figures now ruling Pig metal will prove attractive some of these days, but at present it is absolutely without friends. Consequently the demand is confined to small lots at about the following range of prices, but on large lots or forced sales concessions can be had according to the circumstances in each particular case. \$12.25 @ \$12.75, delivered, for Gray Forge or Plain No. 2; \$13.75 @ \$14 for No. 2x; \$14.25 @ \$14.50 for No. 1x.

Steel Billets.—Consumption is much below what it was during the earlier months of the year, hence the light demand and steady decline in prices. Recent transactions have been on the basis of about \$21.50, Philadelphia or equivalent points, but the lots were small, so that they do not represent a fair average of the market. Lots of 1000 tons and upward could be done at \$21 or less, but business of this kind is scarce, so that prices may be considered nominal at \$21 @ \$21.25 asked.

Finished Material.—It would be pleasant to report a better market, but as the facts point in the other direction, we have to continue in the same monotonous strain as during the past several months. Price are weak—we may say weaker, and would probably be still weaker if there was anything worth while to bid on. There is no demand for any but small lots, and these are taken at the same or slightly lower figures than during last week. Prices cannot possibly go much lower, but, somehow or other buyers seem to have everything their own way, and if it is not 1/2¢ lower it has to be a concession of some kind, otherwise sellers fear that the order will go elsewhere. Nominal quotations are about as fol-

Iowa, but on anything attractive concessions are not hard to obtain:

Grooved Skelp, delivered.....	1.55¢ @	1.55¢
Best Refined Bars.....	1.55¢ @	1.80¢
At Interior points.....	1.55¢ @	1.55¢
Tank Steel.....	1.65¢ @	1.70¢
Heavy Plates.....	1.70¢ @	1.75¢
Shell.....	1.75¢ @	1.85¢
Flange.....	2.00¢ @	2.20¢

Old Material.—It is extremely difficult to quote the market correctly, as prices are subject to much wider fluctuations than during ordinary times. Those who must sell have no alternative but to take whatever price they can get, while those who regard the market from a business standpoint, and are in a position to wait for a buyer, quote prices about as follows, although forced sales have in some cases been made at considerably less money:

No. 1 Wrought Scrap, delivered.....	\$12.50 @	\$13.50
Machinery Cast, delivered.....	10.50 @	11.00
Heavy Steel Scrap, delivered.....	13.00 @	14.00
Old Iron Rails, delivered.....	15.00 @	16.00
Old Street Rails, delivered.....	17.00 @	18.00
Wrought Turnings, delivered.....	10.00 @	11.00
Cast Borings, delivered.....	6.50 @	7.00
No. 2 Light Scrap, new.....	8.00 @	8.50
No. 2 Light Scrap, old.....	6.00 @	7.00

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., CINCINNATI, October 4, 1893.

There appears to be a more confident undertone to the Pig Iron market; not that there are any large transactions at better prices, but there is less calamity Iron being forced to sale and the Southern furnaces have a voice in making prices, not leaving it entirely to buyers. There have been no large transactions during the week, but a moderate run of consumptive orders, ranging from single carloads up to 700-ton lots; 400 tons No. 2 Foundry and No. 1 Soft sold at \$8.25, f.o.b. Birmingham, but it is understood that some No. 2 Foundry is yet obtainable at \$8. In fact, there is nothing to warrant any change in quotations. There have been sales of Lake Superior Charcoal Iron to go East and there has also been some Southern Car Wheel Iron sold, for which pretty full prices were realized. There is more inquiry from stove works, and it is confidently predicted that liberal sales will be made to them in the early future, if the repeal of the Silver Purchase law goes through the Senate, for until this matter is out of the way there is no disposition to enter into any important business engagement. Prices of Iron are on so low a basis that there is much confidence felt that they will go no lower, but no early or rapid recuperation is looked for under existing circumstances. Quotations as follows:

Foundry.

Southern Coke, No. 1.....	\$12.75 @	\$13.00
Southern Coke No. 2.....	10.75 @	11.00
Southern Coke No. 3.....	10.25 @	10.50
Ohio Soft Stone Coal, No. 1.....	15.50 @	16.00
Ohio Soft Stone Coal, No. 2.....	14.50 @	14.75
Lake Superior Coke No. 1.....	15.00 @	15.25
Lake Superior Coke No. 2.....	14.00 @	14.25
Hanging Rock Charcoal, No. 1.....	18.50 @	19.00
Hanging Rock Charcoal, No. 2.....	17.50 @	18.00
Tennessee Charcoal, No. 1.....	14.00 @	14.25
Tennessee Charcoal, No. 2.....	13.00 @	13.25

Forge.

Gray Forge.....	9.75 @	10.00
Mottled Coke.....	9.50 @	9.75

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	17.75 @	18.00
Lake Superior Car Wheel and Malleable.....	17.00 @	17.25

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, October 3, 1893.

The situation remains the same as noted last week, as regards volume of business and prices. The further concessions offered by the Amalgamated Association have resulted in two more mills in the Pittsburgh district signing the scale and resuming operations, though not to full capacity. As far as the Mahoning Valley mills are concerned it is believed the new scale, as adopted in conference in Pittsburgh last week, will have very little effect, for the reason that more or less puddling is done by all of the mills at that place, and as the price of boiling was allowed to remain at \$5 per ton the valley makers claim they cannot pay this price and compete with Pittsburgh mills, where the price is lower. It is probable that a conference will be held during this month between the valley mill owners and the Amalgamated Association, at which the price of boiling will be considered. In the Pittsburgh district more mills are in operation than at any time since July 1, but none of them are being operated to full capacity. The fact that most of the mills are running in a limited way, coupled with the small amount of new business that is being offered, is mainly responsible for the very low prices made when a fair sized order is in the market. It is probable that this policy will be continued until the amount of business offering comes close to the output of the mills, or until production has been materially restricted, which the mills at this time do not seem inclined to do. Prices have shown no material decline during the week with the exception of Bessemer Pig, which has sold down to \$11.75, Pittsburgh. It is the impression in certain quarters and also largely among buyers that prices are, perhaps, as low as they will go in some lines, but at the same time there is not enough confidence among buyers to induce them to anticipate their wants, instead of buying from hand to mouth, as they have been doing for months past.

Pig Iron.—The demand continues very light and will likely remain so until there is a heavier demand for Finished Material. Buyers admit that now is a good time to buy Iron for future wants, but at the same time they do not place their orders. With production of Pig Iron cut more than half, and Bessemer selling at \$11.75, and Gray Forge very close to \$11, it is pretty evident that there must soon be a change, and when it does come there will be higher prices. Of course, the market may stay in its present condition for some time yet, or it may take a very sudden turn, but all indications would seem to point to a change for the better when it does come. An additional stack in the Mahoning Valley has been banded since our last report, but this has been more than offset by the starting up of two stacks in the Shenango Valley, one on Bessemer and the other on Mill Iron. In the Pittsburgh district the furnaces active and idle on October 1 showed no change as compared with our statement of condition on September 1. We have reduced quotations slightly on Bessemer, Gray Forge and All Ore Mill, and quote as follows:

Neutral Gray Forge.....	\$11.25 @	\$11.50, cash
All-Ore Mill.....	11.25 @	11.50 "
Bessemer Pig.....	11.75 @	12.00 "

No. 1 Foundry.....	12.75 @	13.00 "
No. 2 Foundry.....	11.75 @	12.00 "
Charcoal Foundry No. 1.....	14.00 @	15.00 "
Charcoal Foundry No. 2.....	13.00 @	14.00 "

We note a sale of 500 tons of Bessemer at \$11.75, Pittsburgh, and one of 1000 tons for October, November and December delivery at a price equal to about \$12, Pittsburgh.

Billets.—A Mahoning Valley consumer has been asking for prices on 10,000 tons of Billets, 1000 tons per month, October to July, inclusive, but the sale has not been closed. It is stated that the price he names as being willing to pay is so low that mills are refusing to consider it. Outside of this nothing has transpired that is worthy of notice since our last report. Small lots of steel are occasionally placed, but the large buyers have not figured in the market for some time. In the Wheeling district a majority of the mills are working, though not to full capacity. In the Pittsburgh district the four makers of Steel are running to about half capacity or, perhaps, a little more. We continue to quote at \$18.50, Pittsburgh.

Wire Rods.—There is a scarcity of Rods for prompt shipment, and one buyer who placed an order last week for 1000 tons for early delivery paid \$28, f.o.b., at maker's mill for them. For late delivery mills are quoting considerably under this price. The increased activity among the Barb Wire and Wire Nail mills is the reason for the improved demand for Rods.

Ferromanganese.—No sales have been made, and we make nominal quotation of \$56 for domestic.

Muck Bars.—There is very little inquiry, and we continue to quote at \$21, delivered at buyers' mill. Pittsburgh makers of Muck Bar are making little effort to sell, on account of the low prices at which outside brands are being sold in this market by two Western mills.

Finished Iron and Steel.—There is a fairly good demand from local trade, and this, in connection with orders taker by Pittsburgh makers in Eastern and Western markets, serves to keep a number of the larger concerns fairly busy. In Beams and Channels there is a fair trade, with no very large orders in sight. There is a considerably better demand for Bars than during August and early in September, with prices ruling somewhat lower. In Plates there is a fair movement, with Tank Steel in better demand than the other brands. For ordinary lots the following prices rule, with concessions made for desirable business: Beams up to 15-inch, 1.60¢ at maker's mill; Angles and Universal Plates, 1.60¢ @ 1.65¢; Tees, 1.65¢; Tank, 1.57¢ @ 1.65¢; Flange, 1.80¢ @ 1.90¢; Shell, 1.65¢ @ 1.75¢; Fire Box, 2.50¢ @ 5¢, according to quality; Machinery Straightened Tire Steel, 1.75¢ @ 1.85¢; Toe Calk, 2¢ @ 2.10¢; Open Hearth Spring, 1.90¢ @ 2¢; Bessemer Machinery, 1.75¢; Steel Bars, 1.85¢ @ 1.40¢ at mill, with Bar Iron extras. Bars in the Mahoning Valley are held at 1.85¢ @ 1.40¢, half extras, according to order. Sheets are in a little better demand, with prices ruling as follows: Soft Steel Sheets, No. 24, 2.45¢; No. 26, 2.55¢, and No. 27, 2.65¢. We quote Galvanized Best Bloom at 70¢ and 10 and 2½¢ in car-load lots.

Wire Nails.—There is an increased demand for Wire Nails, some large buyers in the Northwest having recently come into the market for good sized

blocks. The small buyers are also sending in specifications more liberally and altogether the situation in this trade is considerably better. We quote at \$1.35 @ \$1.40 in carload lots, with the usual advance for less quantities. Cut Nails have also improved in demand, several of the Wheeling mills having booked considerable business of late. The factory of the Laughlin Nail Company at Martin's Ferry, Ohio, containing 226 machines, has gone on full time. We quote at \$1 @ \$1.05 in 30¢ averages at makers' mill.

Barb Wire.—There is a moderate amount of business offering, but with manufacturers showing a greater desire to capture business prices have weakened to some extent. We quote Four Point Galvanized at \$2.30 @ \$2.35 in carload lots at mill, with the usual advance for less quantities. Painted we quote at \$1.90 @ \$2, according to order.

Pipes and Tubes.—There is a fair demand for the smaller sizes of Wrought Iron Pipe, but for the larger sizes there is very little call. The tight money market has prevented the development of natural gas fields, and this has caused a large falling off in demand for Line Pipe. Prices continue low, being governed altogether by the size of the order and the terms of payment.

Connellsville Coke.—About 1700 ovens in the Connellsville region have been fired up during the past two weeks and the outlook for the future of the Coke trade is claimed to be considerably brighter. For the week ending on Saturday, September 23, there were 5293 ovens in the Connellsville region in blast and 12,097 idle, with a total estimated production for the week of 41,350 tons. We continue to quote Furnace Coke at \$1.30 in tons of 2000 lb, f.o.b. cars in Connellsville region. Foundry Coke we quote at \$1.50 to dealers and \$1.65 to consumers.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 30 Dearborn street,
Chicago, October 4, 1893.

Freight rates on Iron and Steel from Eastern points were advanced to the regular winter rates on Monday. Efforts are being made to adjust prices to correspond, but buyers naturally object to an advance under existing conditions. The financial situation steadily grows better. Money is more plentiful and the banks are now discounting good paper with more freedom. The local manufacturing establishments which have recently started up are materially benefited by this improvement in the situation.

Pig Iron.—The inquiry is fair, and while sales are generally of small quantities there is an occasional transaction of good size. One order was placed for 1500 tons of Southern Coke for scattered deliveries and there are rumors of a much larger deal. Instructions are being received to resume shipments on old contracts. The revival in demand now experienced appears to be due generally to the complete cleaning up of stocks of Pig Iron at foundries and not so much to any special improvement in the business of the foundries themselves. The stocks at furnaces are being drawn on so steadily that a decided decrease is expected to be shown at the close of this month. Inquiries for Charcoal Iron are in the market, but not for large

quantities. Prices show no change.

Quotations are now as follows for cash:

Lake Superior Charcoal.....	\$16.00 @ \$16.50
Local Coke Foundry, No. 1.....	13.50 @ 14.00
Local Coke Foundry, No. 2.....	12.75 @ 13.00
Local Coke Foundry, No. 3.....	12.50 @ 12.75
Local Scotch.....	14.00 @ 14.50
Ohio Strong Softeners No. 1.....	15.50 @ 16.00
Southern Silvery, No. 1.....	@ 14.50
Southern Silvery, No. 2.....	@ 14.00
Southern Coke, No. 2.....	12.35 @ 12.60
Southern Coke, No. 3.....	11.90 @ 11.85
Southern, No. 1, Soft.....	12.35 @ 12.60
Southern, No. 2, Soft.....	11.95 @ 12.10
Southern Gray Forge.....	11.10 @ 11.35
Tennessee Charcoal, No. 1.....	16.00 @ 16.50
Alabama Car Wheel.....	18.50 @ 18.75
Hocking Valley, No. 1.....	15.25 @ 16.00
Jackson County Silvery.....	16.00 @ 17.00

Bars.—A moderate inquiry was experienced the past week and some fair sales were made, but within the past day or two much more business has come forward. Among the orders placed last week was one for Car Iron for several hundred cars, which is the first order of the kind that has come up in this locality for a long time. The Calumet works succeeded in starting up last week and are running now on a non-union basis, but pay the same wages paid by the regular union mills. The Milwaukee works of the Illinois Steel Company start up this week on a readjustment of the wage scale of the Amalgamated Association. Bar Iron prices show a wide range, according to the character of the mill and the orders placed. Some manufacturers report sales on a basis of 1.47¢, Chicago, half extras, while others have made sales down to 1.42½¢. Soft Steel Bars are somewhat weaker than they have been, and may now be quoted at 1.55¢, Chicago, for mill shipment, while even this has been shaded in some instances. Good orders have been taken. Jobbers report some falling off in their trade the past week, which is, however, attributed to the closing of the month. Taking September as a whole, it was with them a period of normal trade for the season. Store prices are now 1.85¢ @ 1.70¢ for Bar Iron and 1.70¢ @ 1.75¢ for Soft Steel Bars, but some shading is being done to best buyers.

Structural Material.—Very little has transpired under this head during the past week. Quotations are maintained at the following prices on mill shipments, Chicago delivery: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢.

Plates.—A good contract on which bids have been made is now under consideration by Government authorities for the Sault Ste. Marie Canal. It covers about 1000 tons of Plates, 500 tons of Angles, besides Forgings, &c. Many bids were received from bridge companies and other makers of Structural work. The Detroit Bridge & Iron Works are stated to have been the lowest bidders. A 1000-ton order is in the market from the Pacific Coast. Notwithstanding the advance in freight rates from the East no changes are apparent here in quotations on mill shipments. Store business continues moderately active, as was reported last week. Boiler makers, who have had no new business since June, are now picking up some work. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.75¢ @ 1.80¢; Shell Steel, 2¢ @ 2.10¢; Flange Steel, 2.15¢ @ 2.30¢; Fire Box, 2.75¢ @ 5¢. Store prices now prevail as follows: Iron or Steel Sheets, Nos. 10 to 14, 2.25¢ @ 2.40¢; Tank Steel, 2.10¢ @ 2.20¢; Shell Steel, 2.20¢ @ 2.40¢; Flange Steel, 2.50¢ @ 2.65¢; Boiler Tubes, 67½¢.

Sheets.—Continued business is reported in Black and Galvanized Sheets.

The hesitation in placing large orders early in the summer causes frequent purchases now by the jobbers and large consumers. Mill shipments of Black Sheets are quotable at 2.80¢, Chicago, for No. 27 Common Iron and 75 ¢ off for Juniata Galvanized, with freight added, from mill. Small lots are quoted at 8¢ on Common No. 27 Sheets, and 70 ¢ @ 70 and 74 ¢ off for Galvanized Iron. Sheet Copper is unchanged at 80 ¢ @ 85 ¢ off, according to quantity.

Merchant Steel.—A moderate business only is reported for the past week. Several season contracts were entered, but not for such large quantities as during the previous weeks. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery, Tire and Open Hearth Spring Steel at 1.90¢ @ 2¢; Ordinary Bessemer Machinery, 1.60¢ @ 1.65¢; Ordinary Bessemer Tire, 1.55¢ @ 1.60¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Rails and Track Supplies.—More business is being done in Light Rails than in standard sections. The competition is active on this class of material, owing to the strong efforts being made by the merchant mills to capture this business. Prices on such Rails are \$31.50 @ \$32. Standard sizes are quoted at \$30 @ \$32; Iron and Steel Splice Bars are unchanged at 1.60¢ @ 1.65¢; Track Bolts with Hexagon Nuts, 2.50¢ @ 2.55¢; Spikes, 1.85¢ @ 1.90¢, with very little business doing.

Old Rails and Car Wheels.—The situation has not improved in Old Iron Rails, but some little inquiry from consumers has caused holders to stiffen their views somewhat, and at the moment \$15 @ \$15.50 seems to be the lowest price available. The stock is so large, however, that it is difficult to see how such figures can be maintained. Old Steel Rails 8 feet and over, free from frogs, Guard Rails, &c., have been sold at \$10 within the past week. At this rate short pieces are worth about \$8. No transactions are reported in Old Car Wheels, and a nominal quotation is \$18.

Scrap.—The demand is a little better. A round lot of No. 1 Forge has been sold, and several good transactions have come to light in Cast Scrap. The starting up of rolling mills in this vicinity has caused more business in stock for their use, and the foundries are also purchasing Old Material in greater quantity. Steel is very dull. Selling prices per net ton are as follows: No. 1 Forge, \$10.50; No. 1 Mill, \$9; Sheet Iron, \$5; Pipes and Flues, \$8; Axles, \$16; Horseshoes, \$11; Fish Plates, \$12.75; Spikes and Bolts, \$12.50; Cast Borings, \$5; Wrought Turnings, \$6.50; Axle Turnings, \$8; Heavy Cast, \$9; Stove Plate, \$7.75; Malleable Cast, no demand; Mixed Steel, \$9, gross ton; Leaf Steel, \$16.

Metals.—Carload lots of Lake Copper are selling at 10½¢. Casting Copper is steady at 9½¢ and sales have been made on this basis for future delivery. Spelter is worth 3.55¢ @ 3.60¢ for prime Western brands. Lead is a little firmer, the recent drop having been caused by some refiners unloading surplus stock. The week has been fairly active and sellers quote 3.70¢ for carloads.

T. A. Hagerty & Co., room 987 The Rookery, are now carrying on the commission business in Pig Iron, Coal and Coke formerly conducted by Charles Himrod & Co. Mr. Hagerty is well known in the Iron trade of the North-

west, having been connected with the firm of Charles Himrod & Co. for several years. They represent the Brier Hill Iron & Coal Company of Youngstown, Ohio, and handle other Northern and Southern Foundry Irons, as well as Lake Superior Charcoal. In their Coke trade they make a specialty of Foundry Coke, and are prepared to furnish several brands of the best Connellsville.

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, October 4, 1893.

Pig Iron.—The demand for Pig Iron does not show any improvement, sales running largely from carload orders to 100-ton lots. The immediate future is rather discouraging, as it is impossible to interest consumers even by shading prices. Local agents are all holding back shipments of Iron which ought to have been delivered some months since. The general custom now is to carry as little stock as possible, as it seems that with each purchase a lower price is secured. Until confidence is fully restored this condition will continue. It is not pleasant for furnacemen, but seems the only safe course for consumers to adopt. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	.....	\$12.25 @ \$13.50
Southern Coke, No. 2 Foundry	.....	11.75 @ 12.00
Southern Coke, No. 3 Foundry	.....	11.00 @ 11.20
Southern Gray Forge	.....	10.50 @ 10.75
Southern Car Wheel	.....	17.50 @ 18.00
Lake Superior Car Wheel	.....	16.75 @ 17.25
Ohio Softeners	.....	16.00 @ 16.50
Missouri Charcoal, No. 1 Foundry	.....	18.00 @ 18.50

Bar Iron.—There is not much demand for Bar Iron. Jobbers are doing fairly well, but mills are running short of orders and are only working about half time. Prices are unchanged, as follows: From mill 1.50¢, half extra, f.o.b. cars East St. Louis. Jobbers quote 1.70¢ @ 1.75¢ for lots from store.

Barb Wire.—There has been something of a falling off in the demand for Barb Wire, although an early revival of trade is expected. Prices are fairly well maintained, as follows: Carload lots of Painted to jobbers, \$2; Galvanized, \$2.45. Jobbers quote Painted at \$2.10 @ \$2.15, and Galvanized at the usual advance.

Wire Nails.—The trade in Wire Nails continues to be moderately heavy and mills are now working full time. General quotations from mill are \$1.55, and \$1.50 is quoted net cash in carload lots to jobbers; store price is \$1.60 @ \$1.65.

Rails and Track Supplies.—Business in this department is practically dead, Steel Rails being nominally quoted at \$30 @ \$31. Track Supplies are in the same condition and are quoted as follows: Splice Bars, 1.85¢ @ 1.70¢; Spikes, 1.90¢ @ 1.95¢; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Old Iron Rails are unchanged at \$15.

Pig Lead.—Through a typographical error Pig Lead was quoted in our last report at 3.10¢, but should have read 3.60¢. The market to-day is a trifle heavier at 3.52½¢, at which price several hundred tons have changed hands.

Spelter.—There is a trifle firmer feeling in Spelter, and sellers quote 3.50¢ without, however, making any large sales. There is a steady carload business, but nothing larger.

New York.

Office of The Iron Age, 96-102 Reade street,
New York, October 4, 1893.

Pig Iron.—The market is very dull, and continues irregular, occasional low offerings being made, notably by Virginia furnaces. There has been some talk this week of the formation of a syndicate to take over 15,000 tons of bankers' Iron. We quote Northern brands \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.35 @ \$14.25 for No. 1; \$12.25 @ \$13.25 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$13.25 @ \$12.50 for No. 1 Soft. Gray Forge is \$11.25 @ \$12.

Billets and Rods.—No business of consequence is reported. We quote nominally: Domestic Billets, \$21.25 @ \$23, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$29.75 @ \$31, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—No orders of any consequence have been taken, nor are any in sight. The Rail mills are all practically idle. It is only occasionally that a short run is made to fill small orders. Nor do the manufacturers speak hopefully of the future. They do not expect any work of consequence for the balance of this year and the first month or two of 1894.

Track Material.—Small lots are selling at the following prices: Spikes, 1.80¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered. Concessions would be made for round lots.

Manufactured Iron and Steel.—The amount of new business coming up is unprecedentedly small and prices are therefore altogether nominal. It is believed probable that for good specifications and satisfactory terms of payment very low prices would be made. As instancing the eagerness for work, it is reported that a Pittsburgh mill made a bid, before the specification was ready, for a moderate lot of Bridge material, cut to length, at a price, delivered, equal to 1.4¢ at mill, Pittsburgh. This, considering the circumstances, is a record breaker. We quote nominally: Beams up to 15-inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.55¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.55¢; Soft Steel Bars are 1.50¢ @ 1.70¢; Scrap Axles are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axles, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 70¢ @ 72½¢ @ 45 lb bundle, at mill.

Old Material.—We quote: Old Iron Rails, \$18 @ \$14; Old Steel Rails, \$8 @ \$9, and Wrought Scrap \$9 @ \$11.

Stock Warrants.—The American Pig Iron Storage Warrant Company report as follows:

Stock in yard August 31, 1893.....	Tons,	80,400
Put in yard for 30 days ending September 30, 1893.....	.....	1,500
Total.....	.....	81,900
Withdrawn 30 days ending September 30, 1893.....	.....	4,300
Net stock in yard September 30, 1893.....	.....	77,700

Financial.

The financial situation, which displayed some encouraging signs toward the close of last week, following on the uncompromising tone of President Cleveland's published letter to the Governor of Georgia and favorable rumors from Washington pointing to a probability of speedy action being taken in the Senate in the matter of the Silver bill, has this week again relapsed into a similar condition of uncertainty to that noted in our last week's report. A decisive vote in the Senate seems to be no nearer than it was then; the talk of the silver Senators still flows on unchecked in an apparently interminable stream; and now persistent rumors are being floated hinting at compromise after all. Although these rumors have probably no foundation in fact, yet they serve to depress business and help to check reviving enterprise and speculation; and they are making an unfavorable impression in foreign markets, creating an uneasiness among foreign creditors, who are said to be unwilling to renew loans as they mature.

The protracted delay in the repeal of the Sherman law is being felt adversely in all lines of trade and commerce, and until the obnoxious measure is abrogated any real revival of activity and healthy feeling in the financial and mercantile situation cannot be hoped for. The whole of the business interests of the country are waiting anxiously and eagerly for the desired consummation, and meanwhile there is a growing feeling of distrust and apprehension which effectually checks returning confidence and legitimate enterprise, and which may lead to grave disaster if the wishes of the country are much longer frustrated. In a word, all interests—industrial, commercial and speculative—hinge on the action of the Senate.

The banks are heaping up money at all the great business centers, it is true; but the money is not being deposited by individuals or by business houses, but by out of town banks, as is shown in the following statement of receipts and shipments of currency and gold by express of the 16 New York banks doing chief business with the interior, for the week ending September 29, 1893:

	Received.	Outgo.	Gain.
By express.....	\$7,012,000	\$1,905,000	\$5,106,000
Transactions with Sub-Treasury:			
Transferred to interior.....	.....	150,000	150,000
Ordinary business.....	15,566,000	14,190,000	1,475,000
Total.....	\$22,577,000	\$16,245,000	.....
Net gain of banks for week.....	.....	.....	\$6,431,000

These large amounts of currency that are being received by the banks have enabled those institutions to offer loans on call to almost any extent and at easy rates, but in the present condition of business borrowers are said to be shy of accepting accommodations on this basis; while the city banks are for the moment unwilling to buy commercial paper or make any time loans except in special cases, not desiring to enter into any new time contracts until the Silver Repeal bill is passed, and confidence again prevails.

The weekly statement of the Associated Banks of this city, issued on Saturday, showed a further remarkable accumulation of money at this center. The surplus above legal requirements increased last week \$6,510,550, and stood at \$24,120,500, or nearly \$3,000,000 more than the total amount of outstanding Clearing House loan certifi-

cates, which have during the week been reduced by cancellations to \$21,260,000. The statement, moreover, shows a substantial gain throughout, as will be seen in the following comparison of averages for the last two weeks:

	Sep- tember 30.	Sep- tember 23.	Increase.
Loans.....	\$382,494,400	\$382,145,800	\$348,800
Specie.....	80,786,200	78,662,400	2,123,800
Legal tend.....	41,079,400	34,934,300	6,145,100
Net deposits.....	890,980,400	883,947,800	7,032,600
Circulation.....	14,385,800	13,610,300	775,500

The following shows the relation between the reserve and the liabilities:

Specie.....	\$80,786,200	\$78,662,400	\$2,123,800
Legal tend.....	41,079,400	34,934,300	6,145,100

Total reserve.....	\$121,865,600	\$113,596,700	\$8,268,900
Reserve re- quired against deposits.....	97,745,100	95,986,750	1,758,350

Surplus reserve.....	\$24,120,500	\$17,609,950	\$6,510,550
Excess of reserve October 1, 1892..			\$4,382,400

The retirement of Clearing House loan certificates has gone on actively, as previously noted, nearly \$6,500,000 having been canceled in New York since our last report. Boston, too, has further reduced her outstanding certificates to \$3,900,000.

The monthly Treasury statement of circulation issued on October 3 showed that the *per capita* circulation of the United States increased during September from \$25.01 to \$25.29, or from \$1,680,562,671 to \$1,701,939,918, being the largest actual circulation of money in this country recorded during the present generation. The increase since October 1, 1892, is \$105,889,935. A Washington dispatch remarks on the statement that the largest increase is due to the imports of gold to meet the monetary stringency in New York, which amounted during September to \$14,829,741. The next largest item of increase is \$5,052,817, which is in the national bank notes taken out under the same pressure of monetary stringency. The issue of standard silver dollars in actual circulation is \$58,832,668, the silver certificates in circulation are \$324,955,184, and the Sherman notes are \$148,824,199, making the silver money of the country in actual circulation about \$538,000,000 in addition to \$64,100,205 in subsidiary silver, and a considerable quantity of uncovered silver and its paper representatives in the Treasury cash.

All accounts tend to show that when business does revive the banks will be in splendid condition to help along trade and meet all legitimate demands on them.

At the annual meeting of the New York Clearing House Association, held on Tuesday, the manager's report showed that the exchanges for the year ended October 1, 1893, were \$34,421,380,869, and the balances \$1,696,207,175. The average daily transactions were: Exchanges, \$118,978,082; balances, \$5,616,580. The largest exchanges on any one day during the year were on January 17 last, when they footed up \$216,885,053, and the largest balances settled on any one day were on February 2, when they were \$11,069,991. The smallest transactions on any one day were on August 28, when the exchanges were only \$45,811,648, and the balances \$2,342,928. The debit balances were paid as follows:

United States gold coin.....	\$71,212,700
United States bearer gold certificates.....	65,061,000
United States order gold certificates.....	32,350,000
United States Treasury notes.....	584,618,000
United States legal tender certificates.....	188,120,000

United States legal tenders and cheques.....	\$25,683,175
Clearing House loan certificates.....	239,783,000
Total.....	\$1,696,207,175

Call money on stock collateral has developed still further ease, owing to the accumulation of money at this center. Banks are freely offering at from 2% to 3%, but the demand is said to be light in consequence of dullness in speculation. Renewals rule at 2½% @ 3½%. Time loans are in greater supply at easier rates, coming, it is said, mainly from permanent trust companies, rates being fairly quoted at 4% for 30 days, 4½% for 60 days, and 5% @ 6% for longer terms on active mixed stocks, while lenders may be found willing to contract for any term at 5½% on lines of choice securities. The demand, however, as for call money, is light and little is being done in time contracts. Commercial paper continues slow, a fair amount being purchased by country institutions, but the city banks are not yet buying. The ruling rate is 7% for double-named paper, and as high as 10% is often asked for single names.

Sterling exchange, which advanced last week almost to the point of gold exports, weakened considerably before Saturday, and a further sharp fall occurred early in the present week, bringing the rate down to a point that effectually dispelled all fears of gold exports. A good supply of cotton bills has been a feature of the exchange market which has tended to depress rates. These, however, have now been pretty well absorbed; and on Tuesday the rate for sterling ruled higher again on talk of compromise in the Senate. Actual business was done at 4.82½ for 60 days; 4.84½ @ 4.84½ for demand; 4.85 for cables and 4.81½ for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial par, bank 100 premium; Charleston, buying ½ @ ¼ discount, selling par; San Francisco, sight 20, telegraph 30 premium; Savannah, buying ½ discount, selling ½ discount @ par; Chicago, 75¢ premium; St. Louis, 75¢ premium.

Business on the Stock Exchange has been confined mainly to certain actively manipulated industrials—notably Sugar and Chicago Gas, which comprised one-fourth of the total of last week's transactions—and "grangers," which have been the most active among railway stocks in consequence of more encouraging advices from the West. The better feeling which developed during the week culminated on Saturday with favorable repeal rumors from Washington, sending up some of the active securities. The further delay in the Senate has, however, depressed the market during the present week, which has shown extreme dullness in Wall street. The volume of business done in securities during the week under review has been unusually small, and the market closes irregular and weak. The following list shows the extreme fluctuations in some of the more active stocks since Thursday, September 28:

	High- est.	Low- est.	Closing, Sept. 27.
Am. Sugar Ref.....	90½	86	89½
Atchafson, T. & S. Fé.....	21½	19	19½
Balt. & Ohio.....	68	67½	72
Chicago Gas.....	58½	56	59½
Chic. B. & Q.....	83½	79½	82
Chic. Mil. & St. Paul.....	60½	57½	59½
Chic. Rock Isl. & Pac.....	65½	62½	64½
Del., Lack & Western.....	150	147	147
Gen. Electric.....	43	39½	42½
Lake Shore.....	123	118½	123
Louisville & Nashville.....	52½	49	51
Manhattan.....	126½	123	127½
Missouri Pacific.....	24	22	24½

Minnesota Iron, asked.....	60
National Lead, Common.....	28½
New York Central.....	102½
N. Y., L. E. & Western.....	14½
Northern Pacific, Pfd.....	22½
Philadelphia & Reading.....	18½
Richmond & West Pt., Term.....	3½
St. Paul & Omaha.....	34½
Union Pacific.....	22½
Western Union.....	82½

Government bonds are steady at unchanged quotations—namely, 110 for 4s registered; 111 for coupon 4s, and 98 for 2s registered. The market for railway and miscellaneous bonds is dull, with prices irregular and weak. Bar silver has declined in price. Last quotations in London were 38½ pence per ounce, and in New York 74¢ per ounce. The Treasury purchased on Wednesday 260,000 ounces at 74.25¢. A Treasury statement just issued shows that during the past quarter the Department purchased under the terms of the Sherman law 8,923,108 fine ounces of silver at a cost of \$6,479,008. The details of purchases were:

Month.	Fine Ounces.	Cost.
July.....	2,218,962	\$1,583,230
August.....	3,334,467	2,801,260
September.....	2,739,629	1,983,629

The grain and cotton markets have developed strength in consequence of an anticipated brisk demand for those staples after the repeal of the Silver Purchase law. Shipments have been rather higher during the week.

Metal Market.

Copper.—The only change in the market for this metal is a somewhat higher level of speculative bids for Lake Superior Ingot. Whether it is significant or not remains to be seen. It is the fact, however, that those bids were not high enough to lead to business. Outside of what may be termed the speculative circle there has been no change whatever. Home consumers have purchased in a strictly perfunctory manner; export movement, has been chiefly in delivery on old contracts and the offering has shown no sign of change on the part of sellers. In any event, 9½¢ stands as strictly inside price, while 9½¢ @ 10¢ is generally quoted. Other varieties have remained almost stationary, with the range of 9½¢ @ 9½¢ quoted for Electrolytic and 9½¢ @ 9½¢ for common Casting stock, according to brand and delivery.

Pig Tin.—The price for Straits Tin for prompt delivery has been moved up to 21¢ per lb. In remote instances a shade more was paid. Deliveries at sellers' option this month and the balance of the year advanced correspondingly. In the interval contracts representing a few hundred tons were turned, but the greater portion of the Tin delivered was taken care of in good shape, and intimations of a "flurry" over October contract deliveries were not realized. Purchases by jobbers and consumers have, according to most accounts, been very moderate, but official statistics make it read that the consumption last month was equal to that of July and August, and that spot stocks, exclusive of the Pacific Coast, have been reduced to 5155 tons, or, say, less than four months' estimated consumption. At the close the market was rather soft, with sellers at 21¢ cash, for prompt delivery, for lots of 10 tons and over. Data posted on the Metal Ex-

change affords the following comparison:

Shipments:	Sept.	Aug.	July.
Tons.	Tons.	Tons.	Tons.
Straits to Great Britain.	2,200	2,360	1,150
Straits to Continent			
Europe.	1,100	1,900	1,200
Straits to United States.	150	None	None
Total from Straits.	3,450	4,260	2,350
Australia to Great Britain.			
Australia to United States.	430	500	300
Total from Australia.	430	500	300
London to United States.	60	None	None
Holland to United States.	None	None	None
Total from Europe.	60	None	None

Consumption:	Sept.	Aug.	July.
Tons.	Tons.	Tons.	Tons.
London deliveries.	1,770	2,070	2,060
Holland deliveries.	200	890	370
United States, excl. Pacific Coast.	1,800	1,900	1,600
Total.	3,570	4,600	4,030

Stocks:	Sept.	Aug.	July.
Tons.	Tons.	Tons.	Tons.
In London.	2,500	1,891	2,022
In Holland.	1,250	390	1,140
In United States, excl. Pacific Coast.	5,155	6,710	8,310
Total close of month.	8,905	8,991	11,472

Stocks afloat:	Sept.	Aug.	July.
Tons.	Tons.	Tons.	Tons.
For London.	3,985	3,394	2,387
For Holland.	1,080	1,280	1,220
For United States, excl. Pacific Coast.	170	None	None
Total close of month.	5,135	4,574	3,457

Oct. 1. Sept. 1. Aug. 1.
Total visible supply '93. 14,090 13,565 14,929
Total visible supply '92. 14,741 14,720 14,181

Pig Lead.—About 1000 tons of Common Domestic have changed hands during the past week, chiefly for October and November delivery. The terms were 3.70¢ @ 3.75¢ and about equal quantities went at respective prices. At present 3.70¢ is bid, and there are few, if any, sellers of round lots at less than 3.75¢ for any delivery during the balance of the year. While average prices are thus lower at the present time than they were a week ago, the market has gained somewhat in tone since the consummation of the contracts above referred to.

Spelter.—Single carloads of ordinary Western have been sold to a moderate extent at 3.80¢ for November and December delivery. Bids of 3.75¢ have been solicited for round lots, in the face of reported light supplies in first hands and comparatively small production at the present time. Eastern consumers are very indifferent buyers, however, and influenced little, if at all, by the reports from the primary sources of supply.

Antimony.—There has been a fair jobbing demand and prices have ruled quite steady for the popular brands. We quote at 9½¢ @ 9½¢ for Hallett's, 10¢ @ 10½¢ for L. X., and 10½¢ @ 10½¢ for Cookson's, in round lots.

Tin Plates.—The demand for Coke Tins for can making has fallen off. From other outlet there has been no offsetting improvement as far as interest in spot goods is concerned, and the demand for "futures" has not improved perceptibly. Naturally there is some unevenness in prices, but no change of importance has taken place during the past week. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14 x 30, \$5.20; J. B. grade, do., \$5.87½; Bessemer full weight, \$5.35; light weights, \$4.95 for 100 lb, \$4.90 for 95 lb, \$4.75 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75 @ \$7. Charcoals—Melyn grade, IC, \$6.35 @ \$6.37½; Crosses, \$8; Alloway grade, IC, \$5.60; Crosses, \$6.75; Grange grade, IC, \$5.75; Crosses, \$6.85.

Charcoal Terns.—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.32½ @ \$5.35; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.75; do., 20 x 28, \$8.90; Abercarne grade, 14 x 20, \$4.60; do., 20 x 28, \$8.80.

C. Kirchhoff, special agent of the United States Geological Survey, has published the following preliminary statement of the production of Lead for the first half of 1893, the delay in publication being due to the absence of certain import returns from the Pacific Coast:

Year.	Desilverized Lead.	Soft Lead.	Total production refined Lead.
1886	114,829	20,800	135,629
1887	151,545	25,145	176,690
1888	151,465	20,081	171,546
1889	153,709	20,258	173,967
1890	180,408	31,351	211,759
1891	171,009	31,197	202,206
1892	181,654	31,678	213,332
1893, six months.	95,621	16,306	111,927

Year.	Refined in bond.	Available for home market.	Contents of Mexican and Canadian Ores imported	From American sources.
1886			5,000*	130,629
1887			15,000*	145,700
1888			23,686	151,919
1889			26,570	156,397
1890			18,124	143,680
1891	2,700	198,706	21,182	178,554
1892	12,574	200,388	26,734	173,654
1893, six months.	12,230	99,606	15,860	83,886

* Estimated.

Included in the above production is 2401 tons of Antimonial Lead, for the first six months of 1893, as compared with 5039 tons in 1892 and 4043 tons in 1891.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 4, 1893.

The market for Pig Tin has been quiet, and the tone is undecided. Prices have been turned on small sales with the tendency downward, owing to heavy shipments hence from the Straits. The amount sent forward last month was 3295 tons, and it is calculated that the visible supply has increased 525 tons. Prices receded to £78. 17/6 for prompts, and £79. 7/6 for three months' futures.

Copper has undergone little change in price. A few buying orders and some "bear" covering, brought about slight improvement, but lack of consumptive demand and light offering subsequently left the market apathetic. Speculative interest is particularly small. Last transactions in Merchant Bars were at £41. 15/ for prompts and £42. 2/6 for three months' futures. Best selected English was quoted at £46. 5/. Statistics for the last half of the month show a decrease of 849 tons in the visible supply. Chili charters are esti-

mated at 1000 tons. Sales of furnace material include 1300 tons Montana Matte at 9/ for future delivery.

For Tin Plate inquiries have been more numerous, but actual business was small, owing to the lowness of bids, except for Oil sizes. Large buyers of the latter have shown some disposition to stock up at present rates. There is also rather more business in the Terns, but at low prices. Liverpool quotations are as follows:

IC Charcoal, Alloway grade.	12/9 @ 13/3
IC Bessemer Steel, Coke finish.	11/6 @ 11/9
IC Siemens	11/6 @ 11/9
IC Coke, B. V. grade, 14 x 20.	11/6 @ 11/9
Charcoal Terns, Dean grade.	11/6 @ 11/6

Pig Lead remained quiet, and the market is rather weak at £9. 12/6 for soft Spanish.

Spelter has been very quiet and the market is rather weak, with free sellers at £17. 2/6 for ordinary Silesian.

In the Iron and Steel trades the situation remains unchanged. Demand is slow throughout and prices are soft, without, however, any radical change. Last dealings in warrants were at 42/8 for Scotch, 35/ for Cleveland, and 44/4 for Hematite.

New Publications.

SECOND REPORT OF THE BUREAU OF MINES OF ONTARIO FOR THE YEAR 1892. Toronto.

Archibald Blue, Director of the Bureau of Mines, has submitted his second annual report for that province. Among the interesting statistics are the figures relating to the mining and smelting operations of the famous Sudbury district. It appears that there were raised during the year 1892 72,349 net tons of ore. The smelters worked 61,924 net tons. Although three of the companies have Bessemerizing plants, only a portion of the copper-nickel matte is treated by this process. The quantity of ordinary matte produced at all the furnaces was 6278 tons, and of Bessemerized matte 1880 net tons, the metal contents of which were 2082 net tons of nickel, 1936 net tons of copper and 8½ net tons of cobalt. Estimating the nickel at 14.2 cents, copper at 6 cents and the cobalt at 21.84 cents, this represents a total valuation of \$826,750. Next in importance is the petroleum industry, the Petrolia and Oil Springs fields netting 800,000 barrels of crude.

Following this statistical summary, there are a series of chapters on matters of interest connected with the mineral industry. Thus, the first chapter deals with iron making in Ontario, which is chiefly historical. Among the interesting records referred to is a statement of the expenses of a campaign of five months of the Marmora Iron Works in 1825. It appears that during the five months the furnace made 273 tons at an outlay of £1567, while the proceeds at Kingston were estimated at £4239, leaving at the foot of the account the "profit she has actually made, £2671. 19/."

The third chapter deals with the iron ores of Ontario, while the fourth is entitled "Treating Iron Ores and Metallic Iron." Statements follow concerning the aspect of the iron industry in Ontario by A. P. Coleman, Samuel D. Mills and Samuel J. Ritchie, the latter two engaged in iron making in this country. Other authorities quoted are James Conmee and Thomas D. Ledyard. A number of chapters follow in regard to nickel, its alloys and its uses.

Original from

UNIVERSITY OF CALIFORNIA

HARDWARE.

Condition of Trade.

A SOMEWHAT BETTER DEMAND is reported by jobbing houses since the opening of October, which is in part accounted for by the fact that orders are usually placed with more freedom the first week or two of the month, and especially in such times as the present, when money is not overabundant. The volume of business, on the whole, continues without material change and the trade are still purchasing with great care and caution. There is a good deal of inequality in the demand, some lines being much more active than others. Builders' Hardware, for example, is moving sluggishly, while seasonable goods, on the other hand, are in very fair demand, comparatively little complaint being made.

Orders from manufacturers for raw material, tools and miscellaneous supplies are referred to as exceptionally tight, a fact which reflects the conservative disposition which characterizes this department of trade. It is a matter of common remark that the retailers as a class are purchasing more freely than the jobbers and the small jobbers more freely than the largest. Some of the leading jobbing houses are in fact limiting their purchases to absolute requirements and prefer to let their stocks be somewhat broken to keeping them fully assorted, as is their usual practice. There is a disposition also to avoid pressing sales and much more attention than usual is being given to the matter of credits. Prices are without material modification, and while on the general line of Hardware they are well maintained, the tone of the market is not strong, and the low prices which are ruling for such staple articles as Nails and Wire tend to weaken the confidence of the trade in the stability of quotations on other lines. As a result there is an entire absence of speculative buying, and orders are limited to early and in most cases immediate requirements. It is gratifying to note that there is much less complaint in regard to collections.

Chicago.

(By Telegraph.)

The month starts off well in Shelf Hardware. The demand is excellent for seasonable goods, but is improving considerably for Shelf goods. Orders are now of a more general character, merchants taking good assortments of Builders' Hardware and other regular articles in the Shelf Hardware line. Business of this character, of course, is not so heavy as in previous years, but the improvement noted is received with much satisfaction. A marked falling off is observed, however, in the sale of Mechanics' Tools. Heavy Hardware has not been so active the past week, sales having declined in Iron and Steel with the close of the month. The month of September, however, was quite good and trade has recently been of normal proportions. All departments of heavy Hardware have not participated in this condition of business, however, as the carriage and wagon trade is still very quiet.

St. Louis.

(By Telegraph.)

There is no great amount of business doing. This is fair week and many thousands of visitors are here who are given more or less attention, but, unfortunately, do not leave heavy orders behind. There is something of a revival in building, which is reflected in the improved demand for builders' supplies. The general demand calls largely for seasonable goods. There is more or less cutting in prices and manufacturers are offering inducements in the way of low prices to move goods. Many large factories are running at a reduced wage account, and instead of taking advantage of this reduction are shading their prices accordingly. This tends to make buyers cautious and they refrain from ordering large quantities.

Louisville.

W. B. BELKNAP & Co.—The market shows certain signs of vitality, but not of animation. There is, incident to the arrival of cool weather, a demand for lighter gauges of Sheet Iron and fire goods generally.

Buyers have no hesitation in taking what they want at current prices, because they are persuaded that there is scarcely a possibility of them going lower in a regular way. Everything is certainly at a low water mark if we know what that means at all. The gradual approach to the zero point in prices is an extremely interesting study to those in our line of business. We

know that they must stop short of that figure, and that they are bound to get more solid every time pressure is put on, but they have yielded so often when we thought a limit reached that we can scarcely confess ourselves surprised at anything.

Another one of our suspended banks has resumed, which puts them all in line again (with a solitary exception, which was a private institution and never admitted to the Clearing House), so that financially our city may be said to be on its feet again.

Locally we are somewhat disturbed by a strike on the part of the machinists of the L. & N. R. R. A recent cut of 10 per cent. in salaries and wages all through the organization was accepted, save only by the machinists, those who ran the repair shops. These, by the help of local unions and certain sympathy of city authorities, are still holding out. So far, however, traffic has been but little disturbed and the places are being filled. When the end comes, as it does when all places are filled by new men, the strikers will find precious little comfort in the headlines of the daily newspapers which now mislead them.

Baltimore.

CARLIN & FULTON.—From the manufacturer seeking a contract, from the salesman soliciting an order and from the columns of the daily press we now have the stereotyped words, "a better feeling prevails," which are encouraging to hear, but which we would like to have echoed by the retail dealer and consumer throughout the land.

To be sure money is more easily obtained by those who some weeks ago could not borrow upon the very best of security, but still business lacks that vigor which should exist, and while Senatorial courtesy prevails the country suffers.

After several years' experience of the Sherman bill, which is the next thing to unlimited coinage, we see to-day the great staples of the agriculturist below the cost of production, the factories and mills standing idle, or, at the most, working but half the time, the wages of labor being reduced and the entire business interests of the country almost prostrate at the feet of half a dozen Senators, whose united constituencies number less than the population of our own city.

The student of political economy most certainly finds in the present condition of affairs in this Government problems hard to understand. One of the principles of this Government is that the majority must rule, but which principle is disowned and repudiated by the highest branch of the legislative department, the United States Senate. Another anomaly in our Government is the existence itself of the Senate as at present constituted in which the State

of Idaho, with a population of but little more than that in a single ward in a metropolitan city, has the same representation as the great States of New York, Pennsylvania and Ohio with their millions.

We have just read that Edison has suggested the substitution of iron as the standard of value instead of either gold or silver, as the latter two metals are almost valueless for use, while iron is a most valuable commodity for an infinity of purposes. His suggestion reminds us of our having read in ancient history that one of the wise rulers of Greece once made all the coin of iron, arguing that bribery would be less frequent, as the bribe to be great, being of iron money, would be almost untransportable.

We suppose eventually the end of the farce will be reached (it cannot be called a debate), but until then this long suffering people will be compelled to read the vagaries and theories of every man who has not yet had printed in the *Congressional Record* his speech uttered for the benefit of a wondering and admiring constituency at home.

Monometallism and bimetalism must still be discussed, State bank issues talked of, national banks attacked.

Last winter we heard, in a speech delivered here, one of the humorists of the House of Representatives confess to the late Secretary of the Treasury, in a joking way, his antagonism to the national banks, stating that they had a strange way with would-be borrowers of exacting what they call collateral, which in his section was the scarcest commodity he knew of, and until this eccentricity on the part of the national banks was removed their unpopularity would not merely continue, but would increase. These words were spoken in jest, but beneath them there is considerable truth.

We are, however, living in hopes of better things to follow; possibly before our next letter is written a vote will have been taken and we will then see trade spring into its greatest activity and a new era dawn upon us.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—It is a very gratifying fact to notice that Omaha is one of the very few cities of the country that can justly claim to have recovered from the ill effects of the recent financial depression. During the dullest times there were those who had predicted that as the business depression had commenced in the East, the revival of business would naturally start at the same point and gradually spread to the West. As there appeared no prospects of any improvement in the East, these prophets are predicting that no substantial improvement need be expected in the West before the first of the year. To all well-informed people hereabouts it was all the time evident that there was no good reason for business being dull in a State like Nebraska, where the crops on which business depended were so fair, and where the farming community was in such a generally prosperous condition. We have frequently asserted in these columns that with everything favorable in this State business would revive as soon as the scare was over. Just as soon as it became apparent that the recent money panic had spent its force confidence immediately commenced to return, and we

note a gradual and steady resumption of business, which before very long will certainly attain normal proportions. July and August, of course, must be classed as "rocky" months. September, however, has shown a decided gain, and if the first half had made as good a showing as the latter half the total volume of business would have aggregated very little short of September of last year.

Jobbers and retailers alike are keeping their stocks down to the lowest possible notch consistent with the demand. This policy will undoubtedly prevail for the remainder of this year, and we are of the opinion that when the annual "round up" occurs January 1, the figures will show a smaller amount of merchandise on hand than for several years past.

Portland, Ore.

CORBETT, FAILING & ROBERTSON.—

Aside from the usual demand for seasonable goods, Ammunition and goods pertaining to the Stove trade, business is very light. This section has been visited by unusually early rains, and while no great damage has been reported, the harvest is several weeks later than usual. Collections are as yet impossible, as little or no wheat has reached tidewater. The low prices prevailing for all farm products, except hops, make the outlook discouraging for an early resumption of business. We trust that this depression will work a reform throughout this section in the matter of credit. Being a new country, and credit necessary to a certain extent, it has of late been abused, and the jobber has had the double function of banker and merchant on his hands, finding both capital and goods for his customer.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—

Mercantile trade circles have shown some increase in the volume of trade since our last letter. This increase, as a rule, comes almost entirely from the agricultural sections tributary to our city, and this trade has not been so closely restricted to immediate requirements as heretofore, although but little disposition is shown to engage in enterprises looking into the future.

Orders for leading goods, like Wire Nails and Barb Wire, are in many cases given in anticipation of wants, owing to the low tempting prices which still prevail, although even those prices would not tempt the buyer in the months of July and August.

Mail orders have been more frequent and extending over a larger line of goods.

Axes have been in good demand, especially through some sections of the South. Southern sections are encouraged by the stimulating influence of cotton shipments, and the fruit districts have reaped considerable of a harvest.

Banks are freely advancing funds for the moving of crops, although still rigidly scrutinizing mercantile paper offered for discount, and outside of regular and valuable customers are not inclined to extend credit, consequently those merchants who have paper offered, not accepted by the banks, are compelled to look for outside buyers, and at a rate varying from 8 per cent. to 12 per cent. per annum, which is almost

prohibitory with the low margin on which goods are sold.

Merchants are compelled to extend further leniency upon collections, although promises for the immediate near future are made in anticipation of receipts from agricultural shipments.

Large exports of wheat and cotton have gone forward during the last six weeks, although somewhat reduced during the last eight days, together with the large investment (of funds lying here) in American stocks and securities, at the abnormally low rate obtainable in the market, have postponed for a time gold exports; but as these purchases are not considered quite sufficient to liquidate the indebtedness for money borrowed upon hypothecated securities during the month of August, the balance of this money is likely to be called for at any moment upon the least cause for uneasiness of foreign holders, and probably would have been before this date had not the rate of interest in the Bank of England declined quite recently fully 1½ per cent.

The goods imported into this country during the months of July and August and the first two weeks of September have largely gone into bond, but the recent slight stimulus to trade has induced parties to withdraw many of these goods from bond, consequently the United States Treasury has been no further depleted.

Surplus funds in our banks have accumulated and a large amount of Clearing House certificates have been withdrawn, but examination into the situation of our manufacturing districts shows but little improvement.

We wish that ended there, but it does not. As an illustration, throw a stone into the water. Is that all? Does it end there? No. See the rays shoot off in all directions from the effects of the stone, which has already reached the bottom, so are the effects of enforced idleness.

Whatever may be the cause or causes of this, we know that a very large proportion of the labor of the country at the present time are unemployed. As a result of not earning money, they naturally have no money to spend.

The effect on the business of the country is serious. The estimate that 1,200,000 are without employment, and that an equal number are employed only from two to four days in the week, would make an average of three days, to which we must add another 600,000. This, at an average of \$1.00 per day (which is a low estimate) for skilled and unskilled men, amounts to \$1,800,000 per day, or \$10,800,000 per week, being at the rate of \$561,600,000 per year.

Many of those who are employed are earning from 10 to 20 per cent. less per day than formerly, and the writer has positive knowledge of a number who have returned to work at one-half their former rates rather than remain in enforced idleness. Reduce this to an average of 15 per cent. and you have an additional \$84,240,000.

In addition to this it is estimated that an amount fully equal to this has been sustained by the reduction in the various stocks and securities throughout the United States, in addition to the loss of interest, which many of these enterprises will be unable to pay.

Nor does it end there. A limited few of the unemployed have been prudent in saving enough to have placed a small sum aside for future wants. This, however, soon becomes exhausted, and both they and those less prudent are already unable to pay their rent, which further reduces money circulation, and

are further compelled to rely upon their nearest stores for credit with a promise of payment from their first earnings. Upon this and perhaps threats of boycott upon factory's resumption, they have secured much needed assistance, until the grocers, butchers, shoemakers and other stocks become exhausted, when further credit must be looked for elsewhere. But the exhausted stocks of those in trade, if not able to procure further goods, must end in failure, the effects of which we have already seen.

The mercantile and business failures reported since January 1 reach the enormous amount of 11,000, being 50 per cent. more than during the same period of 1892, and far in excess of any previous nine months. These failures have carried with them liabilities of about \$325,000,000, the aggregate of liabilities being over four times greater than those of 1892.

The number of bank suspensions, including national, State and private banks, for the first 9 months, have reached 549, with liabilities of over \$155,000,000.

How much embarrassment this has caused is not shown upon the face. Many merchants have not been able to pay their bills; neither does it end there. Persons they owed have been restricted from paying their bills, and so on to an endless number. Thus the rays shoot out as the rays from the stone that is thrown into the water.

Nor does it end there. The facilities for ascertaining these facts are equally available for future reference, and, when again asking for credit, reference is made to the published mercantile agency's reports, and one reads there, "failed in 1893," and whether the asker of credit is located in the same city or not, the same penetrating system of the agency will follow him from city to city, from State to State, and from the Atlantic to the Pacific, and whether in mercantile, manufacturing or banking business, one reads, "failed in 1893."

Nor does it end there. Idleness carries with it, especially with the young, uneasiness and unrest. The writer passing a familiar face of an unemployed workman a few days ago overheard the following remark: "Joe, I broke the record yesterday. I went into ———'s billiard saloon at 9 o'clock in the morning and never left for dinner or supper until 10 o'clock at night. Found my wife as mad as a hornet."

Circumstances of this kind bring drink, as continued idleness is followed by distress, privation, suffering and want, begging or stealth.

It is a well-known fact that we have in this country a large number of workmen who came from foreign shores. Many are of that class—uneasy, dissatisfied and disturbing elements—and many came here, doubtless, with an exaggerated idea and are not prepared to rest satisfied under the existing state of depressed trade; and in cases of this kind may we not even look further than the above and say, it will bring crime?

Thus the rays, like those from the stone that has fallen to the bottom, shoot out in all directions.

Oh, you who have been sent to Washington from promises made for the betterment of mankind; you who have gone there from votes secured from promises made to the uninformed millions of wage earners; you who have created revengeful dissatisfaction in the ranks of the poor workmen, and have gone there from the promises of a better future; you who have promised them uninterrupted employment at higher wages with less expenditure;

you who have promised those engaged in mercantile pursuits more satisfactory returns for capital invested; you who have promised those engaged in agricultural pursuits a larger return for their products, do you realize what responsibility rests upon you? Do you realize it is upon you that rests not only the responsibility of the power given to you to either continue the former prosperity or revolutionize the conditions into hardship, poverty and want of the millions, and riches only for the few who are so situated to profit by the downfall of others.

Do you realize what faith was placed in you when those promises, which secured you votes, were given? If these promises were given for political ascendancy only, without pure motives and intentions, can you look back upon those promises without a blush of shame? The eye of public opinion is focused on Washington.

Unquestionably there is a growing impression that the leadership of the Senate is in unfortunate hands, owing to the fact of his previous record, prior to February 1, 1893, not having been favorable to the administration's present desire and intention, and his sudden conversion simultaneously with his assuming the leadership, no doubt places him in an equivocal position.

If correctly reported, during last winter, when the effort was made to repeal this same law, he stated that the effects of repeal would be disastrous; therefore he is naturally unable to be dictatorial, but must submit to what his country is now suffering—"the courtesy of the Senate."

If the vote had been taken two weeks ago, which, with proper management, could have been the case, the pending bill would now be a law, but in the meantime complications (as suggested by us might arise) have now become a settled fact, and a game of politics may yet be played to further delay, if not entirely prevent, its passage without some (now demanded) compromise.

New Orleans.

A. BALDWIN & Co.—There is something of an improvement in the general situation, and orders are beginning to come in much more freely, both from our traveling men and from customers direct. There were more buyers in the market during the past week than we have seen for some months back. They have about come to the conclusion that they will have to replenish their stocks notwithstanding the financial depression. In anticipation of an immense crop in the sugar districts, orders from these sections are very liberal. Collections are becoming somewhat more easy, and altogether there is a decided improvement to be noticed in all lines.

Cleveland.

THE W. BINGHAM COMPANY.—Trade for the past two weeks has not shown the same degree of improvement the first two weeks of the month did, but has not fallen off any. We should say it had about reached its limit for this fall; at least until our factories show more activity. Business in agricultural districts is about as good as usual, but in communities dependent upon manufacturing it is almost nil. The demand for season goods continues excellent. Wire and Wire Nails have fallen off both in demand and price. Collections are fair.

Notes on Prices.

Wire Nails.—During the past week the condition of things referred to in our last report continued without important change. The volume of business has been fair considering existing conditions and most of the mills have a moderate supply of orders. Prices are without improvement on a basis of \$1.80 to \$1.35 for large lots at mill, the former figure being usually obtainable. It is understood that in some cases it has been shaded.

Chicago, by Telegraph.—The approach of winter and the prospects of the close of navigation have caused an increased inquiry for Wire Nails from various parts of the Northwest and the trade of the past week has been a little better than previously. Factories able to make shipments by lake have been especially favored by this inquiry and their reports are rather more cheerful than those of their competitors. Prices may be quoted on a basis of \$1.40 to \$1.45, Chicago, for factory lots. Jobbers are experiencing a good demand from their customers and continue to quote regular prices at \$1.55 for small lots from stock.

Cut Nails.—The Cut Nail market is not in any better condition than the Wire Nail market. The demand is small and prices somewhat irregular and weak. The market is represented by the quotation of 95 cents to \$1 for carload lots at mill, but it is not unlikely that with attractive averages and desirable orders slight concessions could be obtained. Most of the mills are limiting their production and some are shut down altogether. The feeling is expressed that there is but little ground for anticipating an early improvement in either demand or prices. Small lots from store in New York are held regularly at \$1.25 to \$1.80.

Chicago, by Telegraph.—A better business is reported in Cut Steel Nails, but not enough to push the factories to any serious extent. Prices are unchanged at \$1.20 to \$1.25, Chicago, for factory lots, notwithstanding the advance in freight rates from Eastern points, which went into effect on Monday. Jobbers report a good business in city orders, but very little demand from the country. They quote \$1.80 for small lots from stock.

Barb Wire.—There is but little doing in Barb Wire. Prices are somewhat ragged and weak. The market is represented by the quotation of \$2.30 to \$2.35 for carload lots of Four-Point Galvanized at mill. Small lots from store are quoted at about the usual advance.

Chicago, by Telegraph.—The Barb Wire situation has attained a point beyond which there seems to be no improvement. Farmers are evidently not doing as much as had been expected in construction of fencing, and manufact-

urers' orders are consequently rather light. Carload lots of Glidden Wire are now selling at \$2.50 for Galvanized, while Waukegan is quoted at \$2.65, with 10¢ added for less than carloads. Ordinary Galvanized Barb Wire is selling at \$2.45 for carloads and \$2.55 for small lots.

Crown Sad Irons.—The Crown Sad Irons, improved, which are illustrated in this issue, are manufactured by the Colebrookdale Iron Company, Pottstown, Pa., whose New York office is in charge of Duncan K. Major, 103 Reade street. They are sold at a discount of 60 and 10 per cent. from the following list:

No. 280, Plain polished, per dozen sets.	\$24.00
No. 285, Nickel plated, " "	30.00
Extra handles, per dozen....	4.00
Extra stands, " "	1.00

Brace Screw Driver.—Goodell's Brace Screw Driver, offered by C. E. Jennings & Co., 79-81 Reade street, New York, and illustrated in this issue, is sold at \$15 per dozen, net.

Glass.—There is no noticeable change in the condition of the Glass market since our last report. The limited demand for Window Glass continues, but the National Window Glass Company do not consider that the demand justifies the starting up of factories. Some of the New Jersey factories are reported as starting up, also one factory in Pennsylvania and one in Indiana. The demand for imported Glass is comparatively small, and American Plate Glass works are finishing up sufficient of the rough Glass on hand to fill orders. Quotations remain unchanged and are fairly well maintained as follows: American Window Glass, less quantities than carloads, 80 and 10 per cent. discount, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Russell & Erwin Mfg. Company's Columbian Exhibit.

ON pages 105 and 106 of this issue Russell & Erwin Mfg. Company illustrate, as well as is practicable on a reduced scale, an attractive and comprehensive exhibit of their products, now to be seen at the Columbian Exposition. This display is doubtless one of the most interesting, artistic and complete representations of Hardware of this character, ever brought together in one exhibit, and the only one of its kind at the great fair. The cases are arranged in a hollow square, the outer sides of the two wings being utilized for show purposes. The goods are arranged on the backs of the cases very ingeniously to secure the best effects, reflecting much credit on the designer. This extensive line embraces Hardware not

only for home or domestic uses, but also a profusion of special designs and patterns suitable for trade abroad. This affords an opportunity for interesting comparisons of the different styles and kinds used by various countries of the world. Distinctive features in Screws and Bolts are also seen to advantage, including some with helicoid shanks. Handsomely mounted samples are distributed on tables for critical inspection. Altogether this exhibit may be regarded as one of the attractive features of the great Manufactures Building.

The Hardware Club.

A MEETING of the Board of Governors of the Hardware Club of New York was held Wednesday. Applications for membership in the club were received from the following gentlemen, who were unanimously elected:

WILLIAM H. CLARK, New York.
J. A. DE CAMP, Russia Cement Co., New York.
HON. THOMAS F. GILROY, New York.
EDWIN E. JACKSON, JR., 99 Nassau street, New York.
LYMAN D. MORSE, Potter Building, New York.
GUSTAV OTTO, Rawo & Dotter, New York.
AUG. G. PAINE, New York & Pennsylvania Company, New York.
A. G. PAINE, JR., New York & Pennsylvania Co., New York.
CHARLES REED, 228 Fulton street, New York.
FERDINAND W. ROEBLING, John Roebling's Sons' Company, New York.
FRANK C. TURNER, Ossawan Mills Co., Norwich, Ct.
J. E. VAN DOREN, 82 Tribune Building, New York.
GEO. B. WEAVER, 196 Fulton street, New York.
ANDREW J. WHITE, New York.

Hon. Thomas F. Gilroy is Mayor of New York City, William H. Clark, Corporation Counsel, and Andrew J. White, Dock Commissioner. Mr. Gilroy's predecessor, Hon. Hugh J. Grant, is also a member of the club.

To such as are already identified with the Hardware Club of this city, or hope to be, it may be of interest to note the progress made during the past few months looking to the permanent installation of the club in its handsome quarters. Various vexatious delays have postponed this event longer than originally contemplated, but as things now look the owners of the Postal Telegraph Building feel reasonably sure that possession can be given some time in January next. All through the summer the House Committee have held frequent consultations, and have been

indefatigable in their efforts to provide suitably for the club's requirements, in the way of furnishings in keeping with the interior, as it will be turned over to them. This committee has secured the counsel of a practical expert in such matters, who has, we are told, made many valuable suggestions. The arrangement of the rooms and the numerous details as virtually decided on will, in his opinion, give the club the most complete and attractive quarters of any in this country. The woodwork of the floor will be mahogany. An alteration has been made in the original plan, which has located the kitchen, &c., in an additional story on the roof, built especially for the accommodation of the club. This will permit of a room being set apart in which members may entertain lady members of their families or friends at dinner or luncheon if they desire, while any odors of cooking will be kept away from the rooms. Prominent business and professional men not identified with the Hardware trade are already discussing the desirability of availing themselves of the opportunities afforded for dining among congenial surroundings, which in part may be illustrated by a conversation which recently occurred in a well-known restaurant nearby. One of the governors of the club who has been actively engaged in preparatory work from the start, met a friend at lunch, who introduced an acquaintance who was lunching with him. The third gentleman who is in a financial institution nearby, said, in the course of the conversation, "Why don't you join the Hardware Club; that is going to be the place, soon," adding, "we are all going to join," referring to acquaintances in the concern with which he is identified. The governor said he'd take it under advisement not, however, disclosing his actual relation to the club. At present there are on the rolls about 800 resident and non-resident members in regular standing, not to mention a number whose applications are about to be acted upon, and some who have signified their intention of joining.

Pierce, Butler & Pierce Mfg. Company's Catalogue.

PIERCE, BUTLER & PIERCE MFG. COMPANY, Syracuse, N. Y., and 42 Duane street, New York, have issued a catalogue devoted to Lead Pipe, Solder and Sheet Lead, Gas, Water and Steam Supplies, Sanitary Specialties, steam and hot-water Heaters and related goods. The catalogue contains 465 pages, handsomely bound in cloth with an index alphabetically arranged at the back. The company are the patentees and sole manufacturers of the Florida steam and hot-water Heaters, of which illustrations and price-lists are given, showing the complete line, including the latest improvements. The book is copiously illustrated, with list prices accompanying the illustrations, showing large lines of the goods already mentioned. A telegraph code is given for ordering wrought or cast Iron Pipe, also for questions, answers, orders and shipments, discounts, &c. The work is very complete and will aid in an intelligent ordering of goods.

A Merchants' Local Association.

BY F. H. WOODWORTH.

IN RECENT YEARS there has been a marked tendency on the part of manufacturers to effect associations, combinations, trusts, &c., and in most instances their efforts have been quite successful. Why, then, should not merchants follow in the same line? The time has come in this country where the keen blade of competition cuts such a wide swath that merchants of small or moderate means are almost handicapped by being thrown into competition with large concerns.

The tendency generally on the part of

LARGE HOUSES

is constantly to cut prices rather than to hold them up on a profitable basis. They are jealous of their smaller competitors and frequently would rather give the customer the benefit of their profit than to allow the competitor to make a sale. A great deal of rivalry exists and this rivalry tends to lower prices and demoralize trade.

THERE IS A REMEDY

which, when properly administered, will effect a complete cure, especially among the Hardware merchants—viz., local associations of dealers. I have been a firm believer in this policy for several years, and have endeavored on various occasions to convince my competitors that we would all be very much benefited by an organization of this kind. Finally, after considerable effort, the Hardware merchants of our city (consisting of seven houses) had a meeting one night in March, 1893, and effected a permanent organization, and I am glad that I can speak from experience at this writing.

OUR ASSOCIATION

here has been in existence now for the past six months, and the older it grows the more each member is pleased with it. We all feel benefited, and instead of looking upon one another as competitors we regard each other as friends. We meet regularly every Monday night for the transaction of any business that may be brought before the association. These regular meetings tend to keep up an interest in the association, and, for my part, it is one of the most pleasant evenings I spend during each week. Prices have been regulated and placed on a profitable basis, cut throat business has ceased and petty jealousies have entirely disappeared. We have

CONFIDENCE

in each other instead of distrust, and although business has been very much depressed during the past few months, we have the satisfaction of knowing that we are making a living profit on what goods we sell. Again, I must say

that I heartily favor the local association of Hardware merchants, and feel confident that Hardware merchants all over the country would be much benefited by such organizations when properly conducted.

Export Notes.

W. R. GRACE & CO., exporters and importers, New York, anticipate the arrival of the steamship "Capac," the latest addition to their fleet, about October 15. This is the second steamer built since last winter at Sunderland, England, for the New York & Pacific Steamship Company, operated by W. R. Grace & Co. between New York and West Coast Pacific ports, from Talcahuano to Callao. The "Capac" will leave New York on her first voyage with cargo about October 20. It will be remembered that the steamship "Condar," a sister ship launched in June, left New York on her maiden trip September 5. The next new steamer will be the "Cacique," and with the "Coya," already in the service, will complete the line.

Reference was recently made to changed conditions of business relating to export trade. An order for 200 tons of materials was recently cabled from Australia, and what with inquiries and replies a total of seven messages completed the transaction, all of which, however, had to be confirmed by mail.

One of the shrewd export merchants in New York, doing a large European traffic, is rather inclined to look for a reflection of our depression in European markets during the next few months. According to his logic, they are sensibly affected by what disturbs us.

D. Eggers of Aug. Eggers, Hamburg, Germany, returned to Europe October 3 after a visit to this country, which included the exposition at Chicago. The firm have the agency of the Walworth Mfg. Company, Boston, Mass., for Europe, and import from the United States principally Builders' and Carriage Hardware, plumbers' supplies, fittings, &c. A buying department has been maintained in this city for the past 20 years. There is also a London branch. Salesmen solicit orders in nearly all the countries of Europe.

Richard Köller of the firm of Theile & Quack, exporters, 7 Bridge street, New York, arrived here from Europe October 3. He has been in charge of the main house at Elberfeld, Germany, but will now manage the branch in this city, the senior partner having taken his place at Elberfeld.

Selling to Consumers.

A LETTER from a well known Hardware dealer in one of the larger Indiana towns gives the writer's reasons for not buying goods of manufacturers who sell to consumers. As the trade have the question prominently before them at this time, the following will be of peculiar interest:

When I came to this city nine years ago I assumed charge of the Stove department of this business. I was very favorably inclined toward a certain line of Stoves, having used one of this make in Minnesota. These Stoves were not handled by any retail dealer in this city. Some two or three weeks after I came here a gentleman came into the store and requested me to send for repairs for a Stove of the make which I was thinking of putting in, and remarked that he got that Stove at wholesale price, as it was not sold at retail in our town, and that the manufacturers said, as they had no agent here, that they would sell him anything in their line at wholesale prices. A few days later another party came in for repairs and said that the gentleman for whom I had ordered the other ones had sent him in, saying at the same time that he also got his Stove at wholesale. I made no remarks to these parties, but I made a mental resolution to the effect that it would be very poor policy for me to handle a line of goods at retail upon which people knew the wholesale price, and that fall, instead of buying this line, I bought over \$6000 worth of Stoves from another house, and mind you that the goods which I purchased were not any more desirable than the line which I was formerly in favor of handling.

Retailers with remarkable unanimity are disposed to condemn the practice of manufacturers selling direct to consumers, and to a good extent are in favor of organization to overcome the difficulty. Our correspondent, referring to this part of the subject, remarks:

I think that it is a wrong business principle for a manufacturer or jobber to sell goods direct to consumers because they do not happen to have a retail dealer in that particular town handling their line. I think that an association formed of the best retail trade, which will pledge itself, so far as possible, to discriminate in favor of those manufacturers and jobbers who confine themselves to the legitimate channels of trade, will accomplish a great good.

The following statement made by our correspondent throws new light upon the attitude of manufacturers and jobbers regarding the selling of goods direct to consumers:

I am satisfied from personal conversation with both jobbers and manufacturers that they are absolutely sick of calling on consumers. It is a very expensive way of doing business. Consumers' orders as a rule are very small, in fact, entirely out of proportion to their bump of conceit, and there are very few men traveling who would not much prefer to call on the regular dealers in their respective lines. As it is to-day if a man wants 10 gross of Screws he thinks that he is not on to his job as a buyer unless he gets them direct from a manufacturer. This same rule applies to Belting, Mechanics' Tools, &c.

World's Fair Exhibits.

R. E. DIETZ COMPANY of New York, and STEAM GAUGE & LANTERN COMPANY of Syracuse, N. Y., who have a branch office at 25 Lake street, Chicago, have fitted up a joint exhibit of Lanterns and Oil Stoves in Manufactures Building, section N, block 3. Their space is 20 x 24 feet, inclosed by a neat railing in front, with counters for the display of goods on two sides and a wall in the rear on which shelves have been fitted, while a roof has been built over the top, composed wholly of Lanterns, with a row of Baby Lanterns in front, next Boy Lanterns, next Rocket Lanterns, and the remainder up to the peak all tubular goods, with globes of different colors, making a very unique display. On the corners are globe and square street Lanterns, or corporation Lamps. Hanging from the eaves of the roof, like a fringe, extending completely around the space, are Baby Lanterns. Railroad goods are shown inside the pavilion, covering all kinds of Lanterns, from locomotive Headlights of great power and station Lamps of large size, down to very convenient and beautifully made hand Lanterns for conductors. The Reflector Lanterns are made for both oil and electricity. The display of Tubular Lanterns is very fine and covers many varieties, including Dashboard Lamps, which will neither blow out nor jar out. The Oil Stoves shown are manufactured by the R. E. Dietz Company, also on the tubular principle, and consist of both heating and cooking Stoves. The cooking Stoves are mounted on their own stands, so that they are complete in themselves. In capacity they correspond with a No. 8 cooking Stove. The special claim made for the tubular system on which the Dietz oil goods are constructed is that the oil is perfectly consumed, so that there is no odor, which is a very strong objection ordinarily made to the use of oil for heating, cooking or lighting. In a fine frame are shown the 35 medals received at different exhibitions by the R. E. Dietz Company.

SEDGWICK BROS. of Richmond, Ind., have erected an extremely attractive pavilion in the north end of the Horticultural Building at the World's Fair. It is composed of wrought-iron pipe, with an arched roof, poultry netting being fastened to the sides and top, round which vines are trained. Their exhibit of wire netting and fencing is extensive and well arranged. In one instance a huge column composed of rolls of netting has been erected, the column containing 5760 feet of netting. A very large roll is shown which weighs 660 pounds and is 560 rods long. Scattered about the inclosure, which is fenced with Sedgwick fencing, are lawn settees and chairs made of wrought-iron pipe, with seats and backs of netting. They are galvanized, and are not only comfortable, but are capable of resisting the action of the elements indefinitely.

WM. ROGERS MFG. COMPANY of Hartford, Conn., make an extensive exhibit of their fine Silver-Plated Ware in the Manufactures Building. They have erected a pavilion immediately in the rear of Tiffany's. This pavilion consists of four great showcases, one on each corner of the space, the whole being covered by an arched roof with a cupola in the center, above which stands a gold anchor, representing the company's trade-mark. The showcases are framed in black and gold with Tennessee marble panels running round their bases. The manner in which they are arranged permits entrances on three sides and a large reception room in the interior. The showcases are filled with beautiful specimens of the

company's products, consisting of flat and hollow ware of elegant designs and rich finish. There are exquisite Silver Trays, magnificently engraved Dinner and Tea Sets, and a great variety of table ware. Many of the pieces are shown in sets in beautifully finished plush cases. The exhibit of Souvenir Spoons is particularly extensive. In one window cards are displayed with specimens of metal showing the several stages in the processes of manufacturing German Silver Spoons, German Silver Forks, hand-made solid Silver Tablespoons and Steel Table Knives.

BINNS PATENT BAND COMPANY, Fifth and Berks streets, Philadelphia, exhibit samples of their goods in the Manufactures Building, Section O, Block 1, among the exhibits of woven fabrics, yarns and twines. They have made a very brilliant display of their goods, which are shown partly in a showcase and partly in some 70 glass cases built up to make an inclosure of the space. The company are manufacturers of Binns' patent double-loop hooked ready-made Sash Cords, with groove-pocket attachments complete. This has been recommended as a representative invention of its class by the Committee on Awards of the Scientific Press Publishing Company, under date of March 24, 1893. The company are further exhibiting Yarns, Cords, Trimmings and brilliant goods, chiefly composed of metal in the shape of wire, plate and lametta, in gold, silver, copper, brass and composition, interlaced with silk, wool and cotton, for military, millinery, embroidery, dress and upholstery trimmings, picture cords, &c. This exhibit is a mass of brilliant specimens of this class of goods, and is understood to be the only one of its kind at the fair.

Pyramid and Rack for Show Window.

THE SHOW WINDOW in Carl Recht's Hardware store, Brooklyn, N. Y., is a large one, taking up the entire store front, except that portion devoted to the entrance, this being next to the party wall of the building, at one end of the window. Especial pride is taken by the proprietor in arranging the window, making tasteful and effective displays of Hardware, Mechanics' Tools, Sporting Goods, Tinsmiths' Machines, Tools and Supplies. The accompanying cuts, Figs. 788 and 789 give an idea of the arrangement of the window display at the time the sketches were made. There were four pyramids, one of which is shown in Fig. 788, two on each side of the rack, Fig. 789. These were placed at equal distances from each other so as to occupy the entire length of the window. The rack, as shown in the cut, may also be used in the corner of the window or store. Larger Tools of various kinds were laid on the floor of the window, giving it a well-filled appearance. It will be seen that the pyramid has sides of equal depth, each being 2 feet wide at the base. The back edges are straight and are fastened to the sash at the back with which the window is inclosed, by wire hooks and eyes. The position in which the pyramid is shown in the cut, though not showing both sides equally as when standing directly in front of it, was chosen to better display the arrange-

ment of the tools on one side. The pyramids are 6 feet high, made of $\frac{1}{2}$ -inch stuff, tapering nearly to a point at the top. The pieces are held together along the front edges with

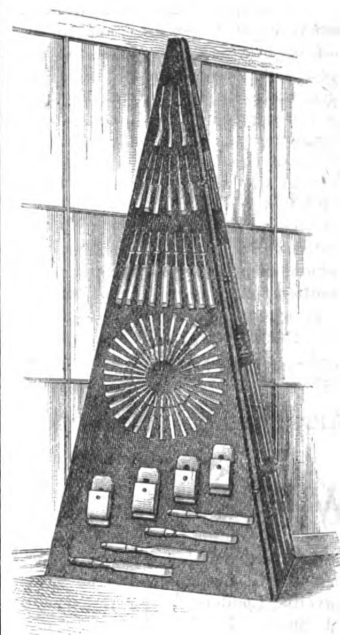


Fig. 788.—Show Window Pyramid.

flat brass hooks and eyes, and may be taken apart for rearranging the display. The boards were first given a thin coat of corrosive sublimate to prevent moths from destroying the covering of red flannel. On the second pyramid were arranged

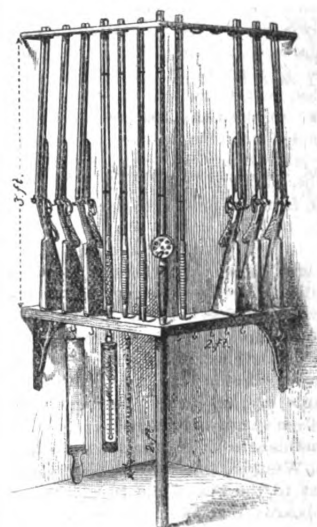


Fig. 789.—Display Rack for Window.

Screw Drivers, Awl Handles and Tools, Spoke Shaves, Rules, Mortise Gauges, Saw Sets, Trammel Points, Try, Bevel and Steel Squares. On the third were Gas Pliers, Carpenter Pincers, Conductor Punches, round and flat nose

Pliers, Calipers and Dividers in great variety, while the fourth pyramid showed Spiral Screw Drivers, Curling Irons, Mattress and Packing Needles, Plumbs and Levels, Plumb Bobs, Blow Pipes, Tape Measures, &c. The rack was supported in front by a round piece of wood 2 feet long, and at the ends by brackets. Loops on the top pieces hold the Guns and Rods in place, while suspended from hooks in the lower pieces were Razor Strops, Thermometers, Key Chains, &c. A display of this kind is allowed to remain in the window for some time, owing to the variety of goods shown and because of the labor and time expended in its preparation. This and previous displays have attracted much attention from passers by, and because of the attention given to this department, the window has become recognized as a distinctive feature of this store.

Arrangement of Stores.

W. O. JACOBS & CO.

W O. JACOBS & CO., Danielsonville, C. nn., have fitted up a building for their Hardware and Stove business, supplied with modern conveniences in the way of three Traveling Ladders, Screw Case, Fork and Shovel Brackets, Stove Truck Casters, &c. The store is well lighted by gas and heated by steam. The building is situated on a corner, having a plate glass front, with double doors between the two show windows.

Large beveled gold letters on a black background, on each window, are the only signs used; and these attract much attention on account of their uniqueness and brilliancy. All interior woodwork is finished in hard oil.

On the left of the entrance is a wall showcase, 7 x 8 feet, containing Saws, Hammers, Hatchets, &c. Over this case is a convenient rack for Fish Poles, next to which is a Gun Case. Next to the Gun Case are about 500 sampled wood Shelf Boxes. The shelving is 32 inches between standards, 8 inches high and 11 inches deep.

In front of these boxes are two bargain tables, in place of counters, for Hardware, Tinware, Lamps, &c., all of which goods are marked in plain figures. The base ledge of the shelving is 34 inches from the floor and 30 inches deep. Under the ledge are cupboards for Shelf Brackets, Wrenches, Powder, Shot in bags, &c. These cupboards are all plainly lettered with Willson's gummied letters.

On this side of the store, on the ledge, is a Westphal's Screw and Shot Case. Next to the Screw and Shot Case are cupboards for Table Cutlery, small Iron Pulleys and Tight and Loose Joint Butts. Next comes File and Drill Cases on the ledge. Over these Cases, and between two windows that light this part of the store is shelving for Blacksmith Supplies. In rear of the store are bins for Carriage Bolts, Coach Screws, Washers, &c., the sizes all plainly marked with Wilson's

gummied figures. Above the ledge and below are Nail Bins, two bins high, and so arranged that the sizes of Nails that are sold the most are nearest the scale. The mouths of the bins are protected by cast-iron caps.

At the rear of the store is shelving for Tinware and Granite Ironware. Under the ledge are compartments for Iron Kettles, Spiders, &c. Here is a door opening on the side street for the convenience of customers, and for taking out and receiving goods. Next is shelving for Lamps. Next is an open space instead of shelving for piano and banquet Lamps. This space is lighted by a high window. Under the Lamp shelf are cupboards for Lamp Chimneys, Burners, Wicks, &c. In front of the shelving, hung to the ceiling, is a rack made of gas pipe, on which are suspended hanging Lamps.

A jog is made between this and the front of the store by a staircase going up from the outside, under which is a toilet room. On this broad stairway space are two high shelves decorated with Copper Wash Boilers, Nickel-Plated Tea Kettles and fancy Teapots, which brightness adds to the attractiveness of the store. Below these shelves are Shovels, Forks, &c., hung on Hager's improved Brackets. On this side of the store with a passway on either side are arranged Ranges and Parlor Stoves, which are all on Harper's Stove Casters, making it more convenient to show them to customers.

In the center of the store, about 10 feet from the front, are show cases on tables arranged in an open square, the table in front being 7 feet long and the side tables 10 feet long. Under the front table is a door showing the Victor Door Hanger, and back of this is a rod for Tackle Blocks. Under the side tables are Bins and Drawers for garden seeds. In the show cases are shown a fine line of Cutlery, Fancy Hardware, &c. Between these show cases and the rear of the store is the office, 12 x 14 feet, with a handsome railing around it. In the office is an upright desk for the bookkeeper, roll-top desk for the proprietor, and a desk for the head clerk; also safe, copying press, telephone, and a very convenient case for catalogues.

Back of the office is an upright Rack with bins and shelves for Axe Handles, Axes, Picks, Lanterns, &c.; on the back end of the Rack is hung Cross-Cut Saws. At the side of this Rack is an inclosed cellarway, which is 84 inches high from the floor, and made like a hatchway on a vessel, the back part of which is found very convenient for laying goods to be marked. On the right, in the rear of the store, is a double Rack, about 15 feet long, made of gas pipe, hung 30 inches from ceiling, on which is suspended Milk Pails and other Tinware. On the left, in the rear, is a similar Rack for Bird Cages. There is an indirect Radiator in the office and other direct Radiators so arranged that there is a uniform heat throughout the store, and in the coldest of weather the store

is comfortable. While their neighbors' plate glass (which are very carefully inclosed) are completely covered with frost, their own windows are clear as crystal. They have no trouble with the frost, which they attribute to their method of heating, also to the transom being kept open over the door.

Sporting Goods in the Hardware Store.

BY R. T. PALMER.

THE PROFITS from the sale of sporting goods has led wide-awake Hardwaremen to pay greater attention to these lines, and the number who have laid them in during the past few years has greatly increased. There are many places, however, where these goods are not kept in sufficient variety and quantity to do these lines justice. One great aid in purchasing goods suitable to the local trade, and in disposing of them, is the sport-loving proclivity of the merchant himself. From his own indulgence in hunting and fishing he will better understand his brother sportsmen's wants, and it will teach him to avoid burdening himself with unsalable and inferior articles, which in time accumulate into worse than useless stock.

He will be alive to the merits of novelties which are constantly coming on to the market and by providing them will convey to his customers the idea that he is headquarters in his line.

Another most important aid is an early and

SEASONABLE DISPLAY.

not a heterogeneous mingling of all sorts of Hardware with sporting goods—but a window tastefully decorated containing a solid display of Tackle in the early spring just before the opening of the season, with perhaps a display of the same a few weeks later, and an exhibit of Guns and Gun goods in and during the fall.

SOLID DISPLAYS

always attract and hold attention, and no windows are more interesting to man and boy alike than those containing paraphernalia which bring up to the memory instances of boy life.

PRIZES.

In many instances to stimulate fishermen's enthusiasm and rivalry dealers have with much success offered prizes for the largest bass and trout caught during the season, same to be weighed in the dealer's store, while the first bird of the season has become traditional. In smaller cities lawn tennis can be laid in to advantage, more especially so if the dealer associates with those among whom the game is popular. These goods are ordinarily handled with baseball goods by the book stores, and it may often be wiser not to intrude.

BICYCLES

are essentially a part of the Hardwaremen's stock and are deservedly receiv-

ing more attention from the trade. While in the Tackle and Gun lines it is necessary to carry in stock cheap-priced articles for a class of trade who cannot be induced to buy higher grade goods, yet it is always policy to sell a man as good an article as he can be persuaded to buy, even at a less ratio of profit, as a well-suited customer is always a good advertisement, and in nothing, perhaps, as much as in sporting goods. It is good policy in any branch of merchandising to exhibit interest in your customer, but particularly so in the success of your customer with his Rod and Gun.

Tipping Nail Bins.

WE ARE INDEBTED to Charles M. Norton of Lansing, Mich., for the design of Nail Bins, shown in Fig. 787—bins similar to which he has had in use for some time. He does not claim to be the originator,

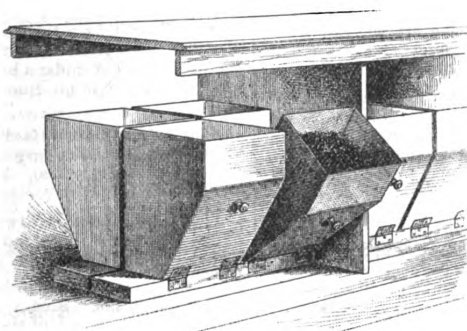


Fig. 787.—Tipping Nail Bins.

as the design was borrowed from Newman & Kennedy of Portland, Mich. Each bin is 14 inches high, straight at the back. In front the straight part is 3 inches high, and the slanting part 11 inches high. Each of the four sides measure 16 inches at the top, while the base is 6 to 8 inches wide and 16 inches long. The bins stand on a plank 2 inches thick, to which they are hinged to tip forward. A base knob is attached to the front of the bin, so that where the bin is tipped forward it is held up from the floor, thus permitting the scoop to go under the front edge when taking out Nails. Two rows of bins were placed under a counter back to back, one row holding Cut and the other Wire Nails. This construction of bins has been found to work very satisfactorily.

Markt & Co.'s Catalogue for Foreign Trade.

MARKT & CO., exporters and importers, 87-95 North Moore street, New York, with Hamburg and London branches, have reissued their catalogue in sectional form in seven volumes, lettered A to G inclusive. Attention is drawn to the territory covered by this house by the words "Our Field" on the cover across a representation of the globe, which is surmounted by an eagle and the motto "E Pluribus Unum." The sectional form

of catalogue has been adopted, so that the numerous interests with which they do business can find in one or more books the class of goods they handle without being compelled to hunt through much they care nothing about. When a house does a diversified trade the whole set is sent inclosed in a neat carton or portfolio tied with tape. The edition has been prepared in such a way that large foreign houses interested in American goods, but who do not care to spend time or money necessary to gather sufficient material for a book, can make use of these by having their imprint on the cover and utilizing as their own. Vol. A contains Mechanics' Tools, Machinery, &c.; Vol. B, Locks, Cabinet and Builders' Hardware and kindred goods; Vol. C, House Furnishing and Plated Ware and analogous articles; Vol. D, Agricultural Implements, Wringers, &c.; Vol. E, Arms, Ammunition and Sporting Goods; Vol. F, Stationery, Toys and Notions; Vol. G, Clocks, Watches and Jewelry, the last two being bound together. A separate price current with discounts accom-

any way to keep up the standing and credit of the house, and at a time when bankers were reducing their loans and customers asking for extensions.

Vacation and a trip to the World's Fair were background thoughts in the minds of "ye" office man, while "Please remit," "Please honor our draft," &c., were the thoughts that were asserting themselves day and night.

The man of finances who has carried his business safely through the past months without disturbing the confidence and serenity of his creditor, customer, banker or colleagues in business may well be called blessed, and deserves to live and succeed till the next panic puts in an appearance, which we all hope will not be very soon.

Mistakes.—The catalogue of a large concern dealing in a varied line of goods and doing a somewhat complicated business contains the following sensible and good-tempered reference to the mistakes which are liable to occur:

ERRORS.—We make them; so does every one, and we will cheerfully correct them if you will write to us. Try to write us good naturedly, but if you cannot, then write us any way. Do not let an error pass unnoticed, or complain to your friends or neighbors about it. We want an early opportunity to make right any mistakes that may occur.

Trade Items.

WE ARE INDEBTED to the Supplee Hardware Company of Philadelphia for a handsomely illustrated volume entitled "The City of Philadelphia as It Appears in the Year 1893." The work has been prepared under the auspices of the Trades' League of Philadelphia for the purpose of giving information concerning many things in which that city stands pre-eminent. Some 85 subjects are treated under different headings, including the Bureaus of Police and Fire, streets, schools and museums, societies, exchanges, Philadelphia homes, railroad terminals, waterways, theaters, clubs, historical buildings and places, guilds, &c. The articles were prepared by officials of the various institutions and by those who are best fitted by education and training for the work. Among the prominent men connected with Iron and Hardware interests whose names appear as directors of the Trades League is that of William W. Supplee.

THE CINCINNATI TOOL COMPANY, Cincinnati, Ohio, whose exhibit at the World's Fair attracted widespread attention, have been awarded both a medal and diploma for their collection of Tools. In addition to this, the judge, the principal of a large Ironmongery establishment located at Sheffield, England, previous to making the award, stated that in respect to small castings the United States was far ahead of England, in regard to both finish and superiority of design. The exhibit of the company has been the means of bringing them numerous inquiries from all parts of the world.

CHARLES L. COLBURN and HENRY B. LUPTON have formed a copartnership under the firm name of Colburn & Lupton, with office at 3 Johnston Building, Fifth and Walnut streets, Cincinnati. In the circular relating to the matter it is stated that the Belfont Iron Works, Ironton, Ohio, Kelly Nail and Iron Company, Ironton, Ohio, and Norton

panies each volume. The entire work is printed in English, German and Spanish, together with a code for cabling.

Trade Topics.

Office Management.—We take pleasure in laying before our readers the following communication in regard to business management with special reference to the financial direction of the business, on the importance of which our correspondent enlarges:

The office and financial part of a business is the nerve force of its life and existence. No matter how expert the "buyer" or the salesman, the office and the financial branch of the business must be conducted with diligent care or success will not be attained.

Show me a business where the office work is properly executed—books balanced, statements sent regularly, accounts looked after—and I will show you a business that is successful, unless it has some unusually damaging or careless features in its other departments.

The man of finances has found his time pretty much occupied during the past few months. With a good spring trade and a flattering outlook for the summer's sales, the buyers were sanguine, and there were few houses but received more goods in June and July applying on contracts and purchases made beforehand than the trade demanded in those months. All of these bills had to be paid in the custom-

Nail Works, Ashland, Ky., have appointed Colburn & Lupton general sales agents for their production of Steel Cut Nails. It is also stated that the new firm will represent the Oliver & Roberts Wire Company of Pittsburgh.

ATTENTION IS CALLED to the Special Notice in this issue of parties who desire to form a connection with a responsible house that has the facilities for placing in this and Spanish-American markets a leading make of Wire Rope. The parties wish to place their product only in the hands of a concern familiar with the requirements of the trade and able to dispose of a large output. The advertisers are a well-known and responsible house, and the matter is deserving the attention of the trade.

I. BREMER, 44 and 46 Duane street, New York, manufacturer of a complete line of dog furnishings, has brought out a dog collar Padlock made of German silver, which is being offered at the same price as the ordinary brass or brass nickelled Lock. This Lock is 1 inch long, $\frac{1}{4}$ inch wide and a fraction over $\frac{1}{4}$ inch thick. The rivets are especially made with shoulders, so that when the cap is riveted on there is no interference with interior works, while the spring is inserted after the interior is cleaned out, thus not injuring the temper of it. One of the advantages claimed is that it can be polished at will and always show the same color. The Locks are mounted three dozen on cardboard with ornamented front, the keys tied on the back.

A MINIATURE "Never-Break" Steel Spider is being sent out with the compliments of the Bronson Supply Company to the trade. This addition to the desk furniture of an office, suitable for holding pins, stamps, &c., will serve to remind their friends of these goods. The company have sent these little articles out very generally, but if any dealers in the trade have been omitted they will be very glad to forward them the Spider, if desired. The Bronson Supply Company have recently added to their numerous lines the entire output of Umbrella Stands, Cuspidors and other specialties in nickel, brass and bronze made by the Ideal Mfg. Company of Philadelphia.

PEERLESS FREEZER COMPANY, Cincinnati, Ohio, have appointed J. C. McCarty & Co., 97 Chambers street, New York, general sales agents, who will be prepared to name the best factory prices at all times. J. C. McCarty & Co. have a full line of samples of these goods and purpose carrying a stock for the convenience of the trade.

AS APPEARS by the Special Notice in another part of this issue, E. Bissell, Son & Co., 12 Murray street and 15 Park Place, New York, will, on Wednesday and Thursday, October 11 and 12, conduct a large trade sale of several thousand dozen Table and Pocket Cutlery, Carvers, &c., as well as about 2500 dozen of flat ware, the latter being by order of the Holmes, Booth & Hayden Company; 150 lots of Hardware, including Hammers, Chisels, Screw Drivers, &c., will also be disposed of.

DILLE & MCGUIRE MFG. COMPANY, Richmond, Ind., have had in the neighborhood of 50 of their McGuire Diamond Lawn Mowers in practical use on the World's Exposition grounds since the lawns were first made. A pamphlet issued by the company has a full page reproduction of a photograph showing 20 McGuire's Diamond Mowers at work, together with two of the

head gardeners, and their E. W. McGuire in front of Agricultural Hall looking toward the statue in the basin. The book also contains cuts and descriptions of McGuire's Diamond, Diamond High Grass, Western, Magic, Crown and Pony Lawn Mowers. An illustration is given of the Handy Clipper for trimming edges of lawns.

A VERY EXASPERATING ERROR occurred in our advertising columns in the issue of September 21. In making up the advertisements of the Hall & Ross Husking Glove Company and the Boss Mfg. Company, the cut showing the goods manufactured by the first named concern was incorporated with new advertising copy received from the latter company. In justice to both concerns we make this statement, and invite the trade's attention to the advertisements of the Boss Mfg. Company and of the Hall & Ross Husking Glove Company, which appear on another page, and with cuts which represent correctly the goods made by the respective companies.

THE PARTNERSHIP heretofore existing under the style of Smith & Rorer, Hardware merchants, Falmouth, Minn., has been dissolved by mutual consent. Smith & Viesselman are successors and will assume the indebtedness and collect the accounts of the old firm.

WE WOULD DIRECT the attention of manufacturers to a Special Notice signed "Hardware Salesman" which is inserted by a gentleman who is well and favorably known to the trade, having a wide acquaintance. He is at present representing in this market a manufacturing company for domestic and foreign trade, and is desirous of making a similar arrangement with parties making a different line of goods.

THE HATCH & HOLMES MFG. COMPANY, Bridgeport, Conn., are bringing out, under brand of the Hatch Cutlery Company, a new line of Pocket Knives, designed to meet the demand for low priced American made Knives of good quality. The new line is made in six sizes, from 3 to 4 inches, one and two blades.

PECK, STOW & WILCOX COMPANY are continually adding lines of goods to those packed in dovetailed wood boxes with slide or hinged covers. Among the last are Razor Blade Drawing Knives with rosewood handles, with nickelled caps and ferrules, a portion of their Auger Bits, and Robinson's Steel Wrenches. The last are put up in half dozens, thirds and twelfths, according to size.

IN THEIR PAGE ADVERTISEMENT appearing elsewhere in this issue, Brittan, Graham & Mathes, Pittsburgh, Pa., direct attention to their sliding barn door Locks. These Locks are referred to as being reversible, self-acting in closing doors, and the simple construction of the Locks is also emphasized.

It Is Reported—

That the new Hardware store of Andrews & Dawes, St. Johnsbury, Va., is nearly ready for occupation.

That Reisinger & Co. is the style of a Hardware firm recently organized at Sewickley, Pa.

That the Hardware firm of J. H. Curtis & Son, Camden, Maine, have been dissolved, J. H. Curtis retiring from the firm. This firm have conducted the Hardware business in Camden for over 20 years, and the senior member, whose retirement is noted, has been in the

business in that place for more than 50 years. The firm have recently completed the erection of a new block. J. C. Curtis will continue the business.

That R. W. Lightfoot, Hardware merchant, at Tuskegee, Ala., has sold out to C. A. Patterson.

That Trowbridge & Wakeman, dealers in Hardware, Hemet, Cal., have sold out. They will continue at Riverside, Cal.

That Neff & Raver, Hardware merchants, Markle, Ind., have sold out.

That J. W. Russell, Otto, Iowa, has disposed of his Hardware business.

That John Murer, Hardware merchant, Norfolk, Neb., has been succeeded by F. A. Beebe.

That Grounds & Frazer, Monmouth, Ore., have been succeeded in the Hardware business by Frazer & Son.

That the Hardware firm of Engelke & Wisrodt, Galveston, Texas, has been dissolved. Wisrodt Bros. are successors.

That an attempt was recently made to burn the large Hardware store of W. H. Tomlinson, Le Sueur, Minn. The fire was started in the basement of the establishment under a barrel of linseed oil. There is no clue to the incendiary.

That Battin & Co.'s Hardware store, at Scranton, Pa., was burglarized a few days since. Revolvers, Knives and Razors comprised the booty.

That E. M. Jones' Hardware store, at Perry, Iowa, was destroyed by fire on the 24th ult. Loss, \$5000; insurance, \$3000.

That Farnham Bros., Washburn, Maine, have disposed of their stock of Hardware and other goods.

That fire recently damaged the Hardware store of M. Nelson, Buffalo, Minn. Loss, \$3500; insurance small.

That A. Adams, Eldorado, Kan., has sold his stock of Hardware and Implements to P. J. Garber, who will continue the business at the same point.

That A. C. Dudley and E. C. Born, formerly of the Warren Hardware Company, Warren, Ohio, have engaged in the Hardware and Tinware business at Ashtabula Harbor, Ohio.

That F. R. Peahak has purchased the Hardware business of L. C. Thompson & Co., Grafton, Iowa.

That G. T. Chellis has purchased the Hardware stock of Cummings & Durgin, Lake Placid, N. Y.

Price-Lists, Circulars, &c.

P. LOWENTRAUT, Kent and Brenner streets, Newark, N. J., catalogue of ice skates, for 1893-94. Illustrations and descriptions are given of the following Skates: Columbia Club, Eureka Club, U. S. Club, XXX U. S. Club, U. S. Racer, Ladies', and U. S. Ladies' Club. Attention is directed to No. 14 $\frac{1}{2}$ XXX U. S. Club Skate as a high grade, finely finished gentlemen's Skate which is put on the market this season. The runners are of welded iron and steel, heavily nickel plated, with beveled edges; toe, foot and heel plate have chamfered edges, and all parts are extra fine polished and nickel plated.

A. B. KOCH COMPANY, Peoria, Ill., Koch's shiftable reversible Shelf Brackets. The Brackets are made in four

sizes, from 6 x 8 to 9 x 21, these fitting into wall plates 3 feet long, suitable for all sizes of Brackets. The plates may be changed to different locations in the store or removed to other buildings, resulting in fittings that are not fixtures.

SHELTON COMPANY, Birmingham, Conn., Bolts, Tacks, Small Nails, &c. The company issue price cards of Glaziers' Points and special Shoe Nails, these goods being comparatively new with them; also a handy price-list of Bolts, Tacks and Lining Nails for the carriage trade.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

In the general situation there is no radical change. Various lines of Paints are more or less irregular in price, owing to the unsettled condition of the Western market for Linseed Oil and White Lead, to say nothing of irregularity in some few lines of base material used in the manufacture of cheap or low grade goods, but facts are not wanting that would show any decided contrast with the conditions that have prevailed for some time past. Business has likewise been similar in character to the general run previously since the opening of the autumn season, with unmistakable evidence that all buyers, from grinders down to small retailers, are content with purchasing as immediate wants necessitate. There is not as much as a shadow of speculation in any branch of the trade.

White Lead.—From certain Western points it is reported that "outside" corrodors are offering their product at prices as low as any that have been made during the past month or six weeks, not only in their own territory but at some point within a few hundred miles of New York. That the competition from this source or from manufacturers of inferior pigment has become more formidable seems doubtful, however, and in some directions there are indications that the narrow margin of profit at present restrains aggressive action to a certain degree. The market, while thus no better in tone, has shown little, if any, decided turn for the worse.

Red Lead.—Dealings in foreign brands have been on a moderate scale, and the demand at present is extremely commonplace. Prices are, however, held quite firmly. The old list prices are still quoted for American product, but, as in the case of White Lead, concessions are said to be made occasionally where active competition is met, particularly on the lower grades.

Orange Mineral.—Although not equal to those of the preceding two or three weeks, the sales of French brands have been fairly large, and German stock has also continued in quite good demand. Prices for both kinds remain unchanged. In the American product there has been a routine sort of business at about former prices.

Zincs.—There has been no radical change in the market for American Oxide. Orders are not coming forward as rapidly as might be desired, and there is room for improvement in the volume of deliveries on old contracts. As natural under such conditions, the market wears a soft appearance, but prices are without decided change.

Foreign brands are generally quoted at former prices by importers, but regulation discounts, it is stated, are deviated from to some extent.

Colors, &c.—In the market for Oil Colors and ready mixed Paints there is some irregularity, the result of rather slow business and cheapness of Oil, but concessions from the minimum prices made during the past fortnight are exceptional. Dry Colors in general have been moving at practically former prices, but hardly as free as usual at this season of the year.

Miscellaneous.—The supply of Block Chalk is heavy, but holders generally stand out for previous prices. Whiting has moved out very fairly on old contracts and enough new business is passing to keep prices quite steady.

Oils and Turpentine.

There have been some changes for the better in prices and little, if any, movement in the opposite direction. To this extent favorable progress may be reported. Otherwise there is little to note that is not practically a repetition of last week's report, since business has been of ordinary character in nearly all departments. Regarding the leading lines of Oils it may be noted that supplies are under very good control and that the tendency of value of raw or crude materials is such that prices would likely advance in the event of demand becoming livelier.

Linseed Oil.—List prices for city brands have undergone no change, all crushers still quoting 40¢ for Raw Oil made from American seed. Some Western Oil has been sold at 39c, and rumor has it that 38¢ was accepted in at least one instance. From the interior it was reported that sales have been made at 35¢ @ 36¢ in the West and that the contest between the "combine" and the independent crushers has not yet ceased in that quarter, whatever may be the conditions here.

Cotton-Seed Oil.—Business in this line has been on a smaller scale and the market presents a rather dull aspect, since both export buyers and large consumers hold aloof as though inclined to await the result of October grinding. Prices have not yielded to any great extent and the market does not appear to be weaker in tone, although quieter. The greatest concession from last week's highest prices was about 1¢ per gallon.

Lard Oil.—Under the influence of enhanced cost of raw material prices for prime Oil have undergone a further advance. City pressers are now generally quoting 75¢, and first-class out of town brands are held at the same figures. The advance of 10¢ in two or three weeks' time has checked business, however, and the market at present is rather slow, although quite firm in tone.

Fish Oils.—In crude Sperm, Whale and Menhaden there has been little movement, and the general situation is much the same as it was a week ago. Pressed and Bleached product are unchanged in price and meet with merely routine sale. Cod Oil is quiet and unchanged.

Miscellaneous.—Ceylon Coconut Oil is firmer, with sales of round lots at 5½¢, and holders now asking 5½¢ @ 6¢. Cochin is held at 6½¢ and upward, but has met with slow sale on the advance. Olive Oil is rather weak at former prices and selling slowly.

Spirits Turpentine.—Operations in round lots have been on a moderate scale, and the market at this writing is rather soft. There was no difficulty in buying regular barrels at 27½¢, and machine barrels at 28¢, on dock.

CONTENTS.

	PAGE.
The Buckeye Triple Expansion Four Cylinder Engine. Illustrated.....	597
The Bessemer Process as Conducted in Sweden.—II.....	601
Ice-Cutting Trolley Wheel. Illustrated..	603
World's Fair Notes	604
Inclinable Drawing Press. Illustrated..	607
A Modern Factory Building	607
Two Modern Methods of Introducing Feed Water Into Marine Boilers. Illus.	608
The Columbian Nut Lock. Illustrated..	609
The Calculation of Limestone Charges for Iron Blast Furnaces.....	609
The Maddox Cotton and Wire Belting. Illustrated.....	610
Treasury Decisions.....	610
Obituary.....	611
Personal	611
Trade Publications.....	611
Lord Armstrong on Rams	611
The Week.....	612
Proposal to Consolidate British Coal Mines.....	612
Editorials:	
The Western Iron Trade	613
Steel vs. Iron in Belgium	613
The Unemployed in Western Cities.....	613
Holding Back Steel Specifications... ..	613
Failures in the Iron Trade.....	613
The Tin-Plate Report.....	614
Washington News.....	615
New Publications.....	615, 623
Manufacturing:	
Iron and Steel.....	616
Machinery.....	616
Hardware.....	617
Miscellaneous.....	617
Trade Report:	
Philadelphia.....	618
Cincinnati.....	619
Pittsburgh.....	619
Chicago.....	620
St. Louis.....	621
New York.....	621
Financial.....	621
Metal Market.....	622
British Iron and Metal Markets.....	623
Hardware:	
Condition of Trade.....	624
Notes on Prices.....	626
Russell & Erwin Mfg. Company's Columbian Exhibit.....	627
The Hardware Club.....	627
Pierce, Butler & Pierce Mfg. Company's Catalogue.....	627
A Merchants' Local Association	628
Export Notes.....	628
Selling to Consumers.....	628
World's Fair Exhibits.....	629
Pyramid and Rack for Show Window. Illustrated	629
Arrangement of Stores.....	630
Sporting Goods in the Hardware Store.	630
Tipping Nail Bins. Illustrated.....	631
Markt & Co.'s Catalogue for Foreign Trade	631
Trade Topics.....	631
Trade Items.....	631
It Is Reported.....	632
Price-Lists, Circulars, &c.....	633
Paints and Colors.....	633
Goodell's Brace Screw Driver. Illus.....	634
The Stafford Quotation Cabinet. Illus.	634
Crown Sad Irons. Illustrated.....	634
The Unique Sardine Grabber. Illus.	635
New Model Ratchet Brace. Illus.....	635
Steel Lock Frame Stove Truck. Illus.....	635
The Standard Watering Pot. Illus.....	636
Improved Barbers' Clipper. Illus.....	636
No. 1085 Receptacle Mill. Illustrated... ..	636
Cronk's Steel Covered Anti-Friction Barn Door Hangers. Illustrated.....	636
Current Hardware Prices	637
Current Metal Prices.....	644

Goodell's Brace Screw Driver.

The cuts herewith given represent a brace screw driver and blades, put on the market by C. E. Jennings & Co.,

Each tray has 40 divisions, which are numbered, and these are attached to a wooden back so as to remove them from the tray. Quotations are filed, the makers state, under the name of the article, and not under the name of the con-

named. A movable index card, which is reversible, bears numbers the same as those on the division leaves, upon which the one filing writes the names of articles or subjects about which information is filed. Suppose a quotation

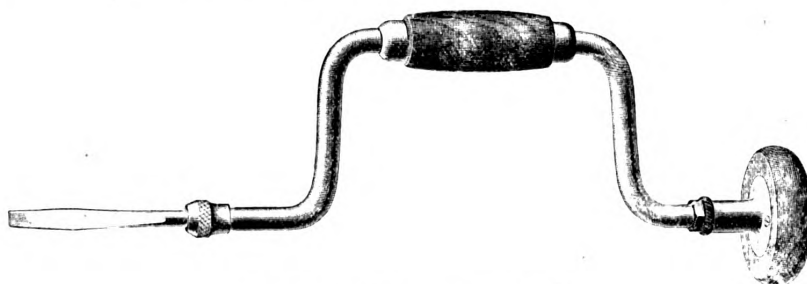


Fig. 1.—Goodell's Brace Screw Driver.

79-81 Reade street, New York. The brace has a nickel plated 6 inch sweep, cocobola head and handle, with an ad-

cern quoting them. This plan is followed as these names are often forgotten, and one could not always tell where in the

had been received on asbestos, it would be entered on the line opposite figure 2 and the communication containing the



Fig. 2.—Steel Blades for Brace.

justable collar for taking up the wear. The manufacturers remark that the chuck on the brace and extension are strong and compact. The brace is packed one in a box, with four forged steel blades, as shown in Fig. 2. Two of the blades are 4 inches long, one 12 inches long; also one 12-inch extension, giving a variety in lengths of 4, 8, 12, 16, 20 and 24 inch blades. The tool is designed for the use of carpenters, machinists, electricians, cabinet, carriage, organ and piano makers.

The Stafford Quotation Cabinet.

The accompanying cuts represent one of the trays as it appears when taken from the Stafford quotation cabinet,

file to look for individual letters, while the name of the article is not forgotten

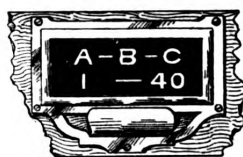


Fig. 2.—Label in Drawer Pull.

on which prices are wanted or the subject upon which information is desired.

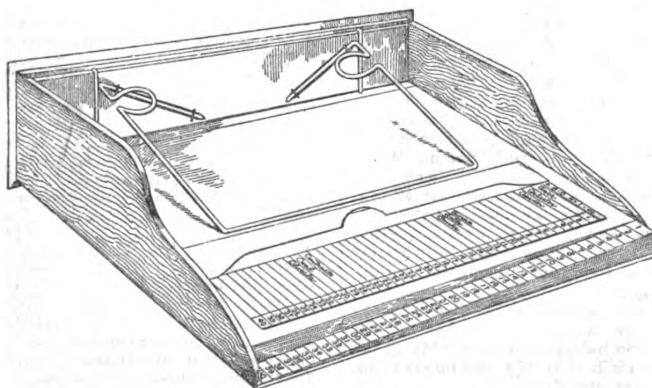


Fig. 1.—The Stafford Quotation Cabinet.

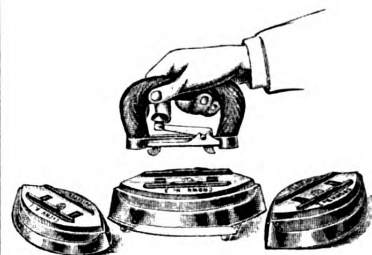
which is put on the market by the E. H. Stafford Company, Grand Rapids, Mich. The tray is made of oak, handsomely finished, with a gilt lettered label in the pull, as shown in Fig. 2.

In the part of the cabinet shown in Fig. 1 are filed only quotations on such articles as begin with A, B and C, or information relating to any department or subject the name of which begins with the letters

quotation would then be placed in division 2 of the tray. If a dozen more quotations were received on asbestos they would all go in division 2 without entering the name again on the index card. In this way all quotations of the same article are kept together. When the tray becomes full the contents are transferred and new divisions and index substituted. The point is made that hundreds of dollars are often wasted in a single purchase because of not having quotations and information convenient. Cabinets are made with two, four, six and nine trays each.

Crown Sad Irons.

The cut herewith given represents improvements in Crown sad irons, as manufactured by Colebrookdale Iron Company, Pottstown, Pa., whose New York office is in charge of Duncan K. Major, 103 Reade street. The handle



Crown Sad Irons.

is made from selected apple wood, worked out by machinery, and neatly finished. The handle is adjusted by raising the knob with the finger, while its shape is such as to adapt it nicely to the hand. The point

is made that the construction of the handle obviates any looseness and rattle. The irons are plain polished and nickel plated, finished in gilt, and are packed three irons, one handle and a stand to a set.

The Unique Sardine Grabber.

Unique Mfg. Company, 35 Murray street, New York, have added a sardine



The Unique Sardine Grabber.

grabber to their line of Unique grabbers, as shown herewith. The grabber has broad blades, one of which is stationary, while the other is operated by a spring. The knob on the handle is pressed, which causes the movable blade to open, and when the pressure on the knob is released the blade closes automatically. The point is made that it is difficult to serve sardines nicely from a box when using a fork, as they are easily broken. The grabber obviates this trouble, and being heavily silver plated and handsomely finished is desirable for use on the table.

New Model Ratchet Brace.

Mason & Parker, Winchendon, Mass., are introducing the ratchet brace illustrated herewith. The manufacturers advise us that there is no pin to hold the ratchet wheel to the staff, and therefore it cannot cut—in fact, that there are no pins of any kind used in its construction; also, that the wheel and socket are of one piece of cast steel, hardened. They further point out that in ratchet braces there is usually but one pawl or one cog on the wheel that

and at the same time two cogs, thus doubling the strength of the ratchet. The point is made that the ratchet mechanism contains but five separate parts, and that there are, all told, but 15 pieces in the brace. There is no ratchet wheel or depressions in which dirt might collect and detract from the appearance of the brace, but instead a clean nickle surface. The jaws, as shown in Fig. 2, are of one piece of oil tempered steel, and will, it is stated,

hold twist drills firmly as well as bits of any make. The head is steel clad and contains a babbit box for a bearing. The makers claim that the brace is strong, durable, simple in construction and well finished.

Steel Lock Frame Stove Truck.

The accompanying cuts represent a steel lock frame stove truck being in-

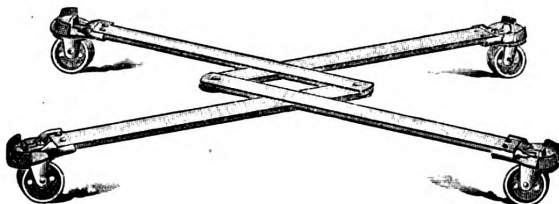


Fig. 1.—Steel Lock Frame Stove Truck, Opened.

roduced by Randall & Ward of Le Roy, N. Y., in which the four arms of the truck are wholly of steel. The truck carries the stove 2½ inches

easily handle any stove. The caster employed is a special one made for the truck and having a particularly deep foot plate. The four double arms are so crossed and bolted together that they become self supporting, and in order to adjust the truck to any stove it is only necessary to pull them apart or push them together, according to the requirements of the case. The steel is nicely japanned, and riveted to the manufacturers' special anti-friction caster with coppered foot plate. The stove truck is fully warranted, and will be offered to the trade as the "cheapest steel truck on the market."

Binns Patent Band Company, Fifth and Berks streets, Philadelphia, Pa., who are manufacturers of ready-made sash cords, are also producing trimmings and brilliant goods, chiefly composed of metal in the form of wire plate and lametta in gold, silver, copper, brass and composition interlaced with silk, wool and cottons. The manufacture of wire plate and lametta previous to the combining of them with the cords is described as follows: First, a bar of standard silver 34 inches long weighing 500 ounces is well forged to make it malleable for drawing. Then it is passed through several sets of steel holes until the proper size of bar is obtained. The required gold leaf is then

put on the bar, after which it is placed in a charcoal fire, properly heated and taken out. It is then rubbed with agate stone to thoroughly burnish the gold on the silver. The bar can be drawn down to almost any size up to 4000 yards per ounce, and to get the fine sizes the wires have to be drawn through ruby, sapphire or diamond holes. The round wire is then passed between two highly polished steel rollers, which flats and gives it a very bright and brilliant appearance. This lametta or plate is then spun around silk, wool and cotton, which is called gold or silver threads or brilliant, as the case may be. The exhibit of the company in Section O, Block 1, Group 102, Class 638, No. 35 in the Manufactures and Liberal Arts Building of the World's Fair, contains over 700 different colorings, shades and combinations, displayed in 70 glass cases.

A pneumatic road skate has appeared in Birmingham, England, which is described as having two wheels, placed in line at either extremity of the skate. The

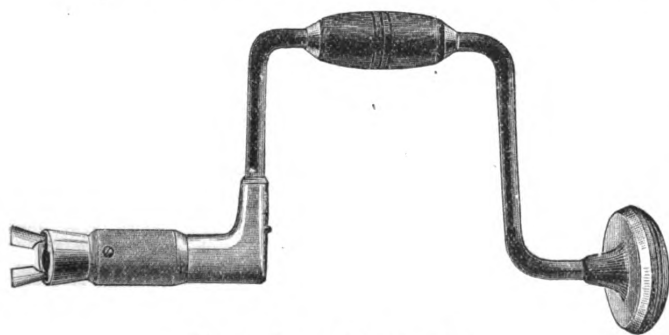


Fig. 1.—New Model Ratchet Brace.

takes the strain at any given time, and this strain is thus wholly upon one side of the center and is not balanced with any strain opposite; but that in this

from the floor, while holding it secure without the use of clamps,



Fig. 2.—Jaws of New Model Brace.

brace there is a bar of steel crossing from one side to the other, equalizing the strain, using both ends of the bar

yokes, bolts or other unnecessary contrivances. The makers state the arrangement is such that one man can

wheels are rather larger than those of the ordinary roller skate, and are covered with pneumatic tires. It is claimed that



Fig. 2.—Truck Closed as for Shipping.

one can skate over ordinary turnpike roads with them the same as on ice, at the rate of 6 or 7 miles an hour, and that hills can be easily ascended and descended. Surplus tires to replace punctured ones, or reserve wheels already fitted, can be carried by the skater.

The Standard Watering Pot.

The accompanying illustration shows the Standard watering pot, put on the market by George H. Engelhart, Glenville, Ohio. The pot is made with a square false bottom so that it will not tip over on being filled, and is pro-



The Standard Watering Pot.

vided with a long and substantial handle and a long detachable spout. The sprinkler on the end of the spout is arranged so as to throw water either upward or downward, as may be desired. It is pointed out that the handle being on top of the can balances it when filled or unfilled, and makes it easy to handle. The opening of the can is so arranged that the water will not splash over or out while carrying it, or when in use. The cans are made in five sizes, of 8, 10, 12, 14 and 16 quarts, and are made of IX tin, painted inside and outside, especially designed for the use of farmers, gardeners, greenhouse and nursery men.

Improved Barbers' Clippers.

Coates Clipper Mfg. Company, Worcester, Mass., are introducing improvements in their barbers' clippers as shown

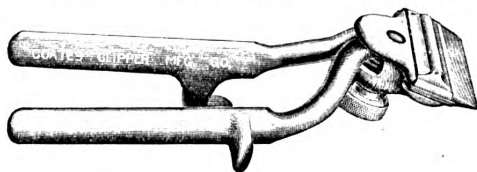


Fig. 1.—Barbers' Clippers No. 31.

in the accompanying cuts. The clippers with the improvements are shown in Fig. 1, while the principle is illus-

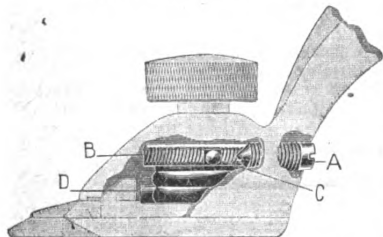


Fig. 2.—Sectional View of Clipper No. 31.

trated in Fig. 2. In this cut A represents the worm wheel screw; B, the worm wheel; C, the end of the spring

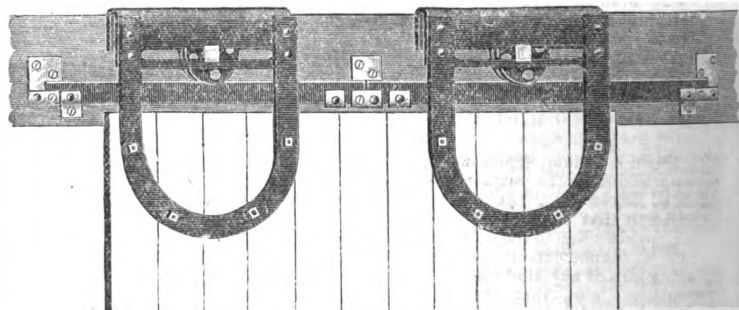
in the worm wheel, and D the end of the spring in the handle. More force is given to the spring by turning the screw to the right, thus winding the spring up; while turning the screw to the left weakens the force of the spring, thus regulating the tension of the spring



Fig. 3.—Detachable Roller.

to suit every hand. The manufacturers remark that the form of the worm wheel has been changed and improved, so that

breakage is impossible with proper usage. The roller in Fig. 3 is attached



Cronk's Steel Covered Anti-Friction Barn Door Hanger.

to a light frame which can be instantly attached or removed from the clipper.

as required. The box is mounted with lacquered copper bronze trimmings.



No. 1085 Receptacle Mill.

The rapid grinding buhrs are made of steel alloy, a metal, it is stated, which

Cronk's Steel Covered Anti-Friction Barn Door Hangers.

Cronk Hanger Company, Elmira, N. Y., are offering a barn door hanger as illustrated herewith. The hanger has a solid cover and rider bar combined, the cover to protect the wheels from ice and snow. The wheels are provided with loose axles which have square heads on each end. When the axle reaches the end of the run it comes, it is stated, against the strap making the wheel revolve in the hub and preventing any wear in the rider bar at the end. It is explained that the hangers are marked with a gauge to put them up by, which saves time and insures them being put up correctly so they will not jump the track even if done by one not accustomed to this kind of work. The manufacturers claim that the hangers possess all the desirable features, and that they are strong and perfect.

No. 1085 Receptacle Mill.

The accompanying cut represents No. 1085 coffee mill, being introduced by the Sun Mfg. Company, Greenfield, Ohio. The mill has a hardwood box with rounded corners, finished with three coats of varnish. It is provided with an air tight canister with screw can top, holding 1 pound of coffee, which can be ground out in quantities

THE MYERS PUTZ POMADE COMPANY, 144 High street, Boston, Mass., have been appointed sole agents in the country for Putz Extract, a preparation for polishing bright metal goods, which is manufactured by Fritz Schulz, Jr., Leipzig, Germany.

Chalk Lines—See Lines.**Chisels—****Socket Framing and Firmer**

P. S. & W. New Haven Withyby 75c100/75c100/100

Ohio Tool Co. 75c100/75c100/100

Douglas 75c100/75c100/100

Buck Bros 75c100/75c100/100

Merrill 75c100/75c100/100

L. & J. J. White 75c100/75c100/100

Tanged and Miscellaneous.

Tanged Firmers 50c50/100/100

Butcher's 50c50/100/100

Spear & Jacksons 50c50/100/100

Cold Chisels, fair quality, P. S. 14c100/100

Chucks—

Beach Pat. each, \$5.00, 30c

Morse's Adjustable, each, \$7.00, 20c20/20

Danbury, each, \$6.00, 30c30/30

Syracuse, each, \$6.00, 30c30/30

Graham Patent, 35c

Skinner's Patent Chucks, 35c

Combination Lathe Chucks, 35c

Universal Lathe Chucks, 35c

Independent Lathe Chucks, 40c

Drill Chucks, 15c

Union Mfg. Co., 35c

Victor, 35c

Combination, 40c

Universal, 40c

Independent, 40c

Churns—

Tiffin Union, each, 5 gal. \$3.25; 7 gal. \$3.75; 10 gal. \$4.25.

McDermid Star Barrel Churn, each 6 gal. \$2.00; 10 gal. \$2.75; 15 gal. \$3.00; 20 gal. \$3.25.

Clamps—

R. I. Tool Co.'s Wrought Iron, 25c

Adjustable, Cincinnati, 15c10/10

Adjustable, Hammers, 15c15/15

Adjustable, Reamers, 30c30/30

Stearns' Adjustable Cabinet and Corner, 30c30/30

Cabinet, Sargent's, 70c100/100

Carriage Makers' Sargent's, 70c100/100

Carriage Makers' Sargent's, 70c100/100

Eberhard Mfg. Co., 40c40/40

Warner's, 40c100/40c100/20

Saw Clamps, see Saws, Saw Folders, 55c10/10

Carpenter's, Cincinnati, 35c35/35

Barnes' Machine's Clamps, 35c35/35

Cleavers, Butchers'—

Bradley's, 35c35/35

L. & J. J. White, 40c40/40

Beatty's, 40c40/40

New Haven Edge Tool Co., 40c

P. S. & W., 35c35/35

Foster Bros, 40c40/40

Schulte, Lohoff & Co., 40c40/40

Clips—

Norway, Axle, 4 & 5-16, 55c55/55

2d grade Norway, Axle, 4 & 5-16, 55c55/55

Superior Axle Clips, 55c55/55

Norway Spring Bar Clips, 4-16, 50c50/50

Wrought Iron Felice Clips, P. S. 55c

Steel Felice Clips, 55c

Baker Axle Clips, 55c

Cloth and Netting Wire.

See Wire, etc.

Cockeyes**Corks Brass—**

Hardware List, 50c50/50

Coffee Mill—See Mills, Coffee.**Collars Dog—**

Chapman Mfg. Company, new list, 40c

Medford Felt Goods Co., 40c100/50

Embossed, gilt, Pope & Stevens' list, 50c

Leather, Pope & Stevens' list, 40c

Brass, Pope & Stevens' list, 40c

Combs, Curves—

Fitch's, 50c100/50c100/100

Rubber, per doz., \$10.00, 25c

American Curry Comb Co., 25c

Kohler's Magic Oscillating, P. S. 25c

Kohler's Humane, 25c, \$1.75

Compasses, Dividers, &c.

Compasses, Calipers, Dividers, 70c70/100

Bemis & Call Co.'s, 65c

Dividers, 50c50/50

Calipers, Inside or Outside, 35c

Calipers, Wing, 35c

Calipers, Double, 65c

Calipers, Call's Patent Inside, 50c

Excelsior, 50c

Stevens & Co. N., 55c10/10

Starrett's Spring Calipers and Dividers, 35c10/10

Lock Calipers and Dividers, 35c

Combination Dividers, 35c

Coolers, Water—

S. S. & Co., 2 gal., \$2.00; 5 gal., \$2.50; 4 gal., \$2.75; 6 gal., \$3.40, 35c

Coopers' Tools—

See Tools, Coopers.

Cord—

Sash—

Common, good quality, P. S. 25c40/40

Patent, good quality, P. S. 10c10/10

White Cotton Braided, fair, P. S. 25c25/25

Common Russia Sash, P. S. 15c15/15

Patent Russia Sash, P. S. 15c15/15

Cable Laid Italian Sash, P. S. 15c15/15

India Cable Laid Sash, P. S. 15c15/15

Silver Lake

A quality, White, 50c

A quality, Drab, 55c

B quality, White, 30c

B quality, Drab, 35c

Sylvan Spring, Extra Braided, White, 30c

Sylvan Spring, Extra Braided, Drab, 30c

Semper Idem, Braided, White, 27c35/35

Egyptian, India Hemp, Braided, 35c

Massachusetts, White, 35c

Samson—

Braided, White Cotton, P. S. 37c

Braided, Drab Cotton, P. S. 42c

Braided, Italian Hemp, P. S. 40c

Braided, Linen, P. S. 50c

Tate's Solid Braided, 35c

Hercules, White, P. S. 25c

Hercules, Drab, P. S. 30c

Economy, White, P. S. 37c

Economy, White, P. S. 37c

Ossawa Mills—

Braided, Giant, White, P. S. 30c

Braided, Giant, Drab and Fancy, P. S. 30c

B 30c

Braided, Crown White, P. S. 50c

Braided, Crown Drab and Fancy, P. S. 50c

Wire Picture—

Braided or Twisted, 50c50/100/100

Corkscrews—See Screws, Cork.**Corn Knives and Cutters—**

See Knives, Corn.

Crackers Nut—

Turner (H. & R. Mfg. Co.) 40c

Blake's Pattern, P. S. 40c

D. M. Stewart Mfg. Co., 40c

Turner & Seymour Mfg. Co., 40c

Acme, 40c

Japanese, P. S. 30c

Nickel Plated, P. S. 30c

Cradles—

Grain, 50c50/50c50/50

Crays—

White Crays, P. S. 75c

Metal Workers, P. S. 1.75, 25c

Rolling Mill, P. S. 2.50, 25c

Railroad, P. S. 2.00, 25c

Napoleon's Pencils, P. S. 1.00, 25c

See also Chalk.

Creamery Pails—See Pails, Creamery.**Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

Curtain Pins—

See Pins, Curtain.

Cutters—**Meat—**

Dixon's, P. S. 2, 10c10/25

Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Hale's, P. S.

Halters
 Cover's Hope, Jute, 60x10x10x25
 Cover's Hope, 7-16 in. Jute, 70x25
 Cover's Hope, 1 in. Hemp, 50x25
 Cover's Adj. Rope Halters, 40x25
 Cover's Hemp Horse and Cattle Tie, 60x10x25
 Cover's Jute Horse Tie, 70x25
 Cover's Jute Cattle Tie, 70x10x25
 Cover's Adj. Web Halters, 50x25
 Cover's Saddlery Works Halters, 35x25
 Cover's Saddlery Works Horse and Cattle Tie, 35x45
 Cover's Saddlery Works Handy Halters, 35x25

Hammers
Handled Hammers
 Maydole's List Dec. 1, '88, 25x10x35x
 Buffalo Hammer Co., 50x10x
 Humason & Beckley, 50x10x
 Aha Tool Co., 50x10x
 Verree, 50x10x
 C. Hammond & Son, 40x10x
 Fayette R. Plumb, 40x10x
 Artisan's Choice, A. E. Nail, 40x10x
 Regular Y. & P. A. E. Nail, 50x
 Horseshoe Turning Hammers, 50x
 Other Hammers, 40x10x
 Cheney's Claw, 40x10x
 Cheney's Machinist's & Riveting, 50x25
 Magnetic Nail, No. 1, 2, 3, 1.25, 1.50, 1.75
 Nelson Tool Works, 40x10x
 Warner & Nobles, new list, 25x10
 Peck, Stow & Wilcox, 40x10x
 Sargent's, 40x10x

Heavy Hammers and Sledges
 3 ft and under, 75x10x75x10
 3 to 5 ft, 75x10x75x10
 Over 5 ft, 75x10x75x10
 Wilkinson's Smiths, 10x10x11x15

Handcuffs and Leg Irons
 See notice Goods.

Hammers
Cross-Cut Saw Handles
 Atkins, new list, 40x
 Champion, 40x
 Ely's perfection, 40x
 Sensible, 40x

Iron, Wrought or Cast
 Door or Thumb, 1 2 3 4
 No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Wood
 Saw and Plane, 40x10x50x
 Hammer, Hatchet, Axe, &c., 40x10x50x
 Brad Axl, 40x10x50x
 Hickory Firmer Chisel, ass'd, 40x10x50x
 Hickory Firmer Chisel, large, 40x10x50x
 Apple Firmer Chisel, ass'd, 40x10x50x
 Apple Firmer Chisel, large, 40x10x50x
 Socket Firmer Chisel, ass'd, 40x10x50x
 Socket Framing Chisel, ass'd, 40x10x50x
 J. E. Smith & Co.'s Pat. File, 50x
 Ely's assorted, 40x10x50x
 Auger, assorted, 40x10x50x
 Auger, large, 40x10x50x
 Pat. Auger, 40x10x50x
 Pat. Auger, 40x10x50x
 Pat. Auger, 40x10x50x
 Hoe, Rake, Shovel, &c., 40x10x50x

Hangers
 Barn Door, old pattern, 70x70x25
 Barn Door, New England, 70x70x25
 Samson Steel, Ass'd Friction, 50x
 Orleans Steel, 50x
 Hamilton Wrought Steel Track, 50x
 50x
 Climax and Friction, 50x
 Zenith for Wood Track, 50x
 Sterling, 50x
 Victor, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Knives
 Barber's, 40x10x50x
 Gorden, Mortar, &c., 70x70x25x25
 Planter, Cotton, &c., 70x70x25x25
 Warren Hoe, 60x20x25
 Magic, 40x10x50x
 See notice Goods.

Hog Rings and Ringers
 See Rings and Ringers.

Hoisting Apparatus
 See Machines, Hoisting.

Hollow-Ware
 See Ware, Hollow.

Holders
 Bag, 40x10x50x
 Spretzie's Pat., 40x10x50x
 Bit, 40x10x50x
 Extension, 40x10x50x
 Ives, 40x10x50x
 Diagonal, 40x10x50x
 Angular, 40x10x50x

File and Tool
 Bals Pat., 40x10x50x
 Nicholson File Holders, 40x10x50x
 Sash, 40x10x50x
 Motley's Adj. Sash, Medium Size, 40x10x50x
 Hooks, 40x10x50x
 Cast Iron, 40x10x50x
 Bird Cage, Sargent's List, 40x10x50x
 Clothes Line, Sargent's List, 40x10x50x
 Clothes Line, Moore's, 40x10x50x

Hay and Straw Knives

See Knives.

Hinges

Blind Hinges

Parker, 75x25
 Butler, 75x25
 Clark's, 75x25
 Clark's Mortise Gravity, 75x25
 Sargent's Nos. 1, 3, 5, 11, 12, 13, 75x25
 Reading's Gravity, 75x25
 Shephard's, 75x25
 Nolessee, 75x25
 Niagara, 75x25
 Buffalo, 75x25
 Clark's Genuine Pattern, 75x25
 O. S. Lull & Porter, 75x25
 Adams, Lull & Porter, 75x25
 Queens City Reversible, 75x25
 Clark's, Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Gate Hinges

Western, 40x10x50x
 N. E. Reversible, 40x10x50x
 Clark's, Nos. 1, 2, 3, 40x10x50x
 N. Y. State, 40x10x50x
 North's Automatic Gate Hinges, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Spring Hinges

Geer's Spring and Blank Butte, 40x
 Union Spring Hinge Co.'s list, 40x
 March, 40x
 Barker's Double Acting, 40x
 Union Mfg. Co., 40x
 Bommer's Japanned, 40x
 Bommer's All Steel Kind, 40x
 Buckman's, 40x
 Chicago, 40x
 Bardley's Patent Checking, 40x
 Acme, 40x
 U. S., 40x
 Empire and Crown, 40x
 Hero and Lion, 40x
 American, Gem and Star, 40x
 Oxford, 40x
 Royal, 40x
 Reliable, 40x
 Champion, 40x
 No. 10 Matchless, 40x
 No. 20 Unbreakable, 40x
 No. 30 Covered, 40x
 Samson, 40x
 Willes, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Wrought Iron Hinges

List February 14, 1891, 50x10x50x
 Strap and T., 50x10x50x
 Corrugated Strap and T., 50x10x50x
 Screw Hook and Eye, 14 to 20 in., 3/4 in. dia., 50x10x50x
 Strap, 23 to 36 in., 3/4 in. dia., 50x10x50x
 Screw Hook and Eye, 12 in. dia., 50x10x50x
 Rolled Blind Hinges, Nos. 23 and 24, 50x10x50x
 Rolled Blind Hinges, Nos. 23 and 24, 50x10x50x
 Rolled Plate, 70x10x50x
 Plate Hinges, 8, 10, 12 in., 5/8 in. dia., 50x10x50x
 Providence, 1 over 12 in., 5/8 in. dia., 50x10x50x

Hoes

D. & H. Scovill, 30x
 Lane's Crescent, Planter's Pattern, 45x25
 Lane's Razor Blade, Scovill Pattern, 30x
 Maynard, S. & O. Pat. Co., 45x25
 Sandusky Tool Co., S. & O. Pat. Co., 45x25
 Am. Axe and Tool Co., S. & O. Pat. Co., 45x25
 Chattanooga Tool Co., S. & O. Pat. Co., 45x25
 Grub, 60x10x50x

Handled

Garden, Mortar, &c., 70x70x25x25
 Planter, Cotton, &c., 70x70x25x25
 Warren Hoe, 60x20x25
 Magic, 40x10x50x

Hog Rings and Ringers

See Rings and Ringers.

Hoisting Apparatus

See Machines, Hoisting.

Hollow-Ware

See Ware, Hollow.

Holders

Bag, 40x10x50x
 Spretzie's Pat., 40x10x50x
 Bit, 40x10x50x
 Extension, 40x10x50x
 Ives, 40x10x50x
 Diagonal, 40x10x50x
 Angular, 40x10x50x

File and Tool

Bals Pat., 40x10x50x
 Nicholson File Holders, 40x10x50x
 Sash, 40x10x50x
 Motley's Adj. Sash, Medium Size, 40x10x50x
 Hooks, 40x10x50x
 Cast Iron, 40x10x50x
 Bird Cage, Sargent's List, 40x10x50x
 Clothes Line, Sargent's List, 40x10x50x
 Clothes Line, Moore's, 40x10x50x

File and Tool

Bals Pat., 40x10x50x
 Nicholson File Holders, 40x10x50x
 Sash, 40x10x50x
 Motley's Adj. Sash, Medium Size, 40x10x50x
 Hooks, 40x10x50x
 Cast Iron, 40x10x50x
 Bird Cage, Sargent's List, 40x10x50x
 Clothes Line, Sargent's List, 40x10x50x
 Clothes Line, Moore's, 40x10x50x

Hooks

Cast Iron, 40x10x50x
 Bird Cage, Sargent's List, 40x10x50x
 Clothes Line, Sargent's List, 40x10x50x
 Clothes Line, Moore's, 40x10x50x

Clothes Line, Reading List

Ceiling, Sargent's list, 60x10x50x
 Harness, Reading list, 55x10x55x10x10x
 Coat and Hat, Sargent's list, 55x10x50x10x
 Coat and Hat, Reading, 50x10x50x10x10x
 Coat and Hat, Moore's, 70x10x50x10x10x

Wrought Iron

Cotton, 40x10x50x
 Cotton Pat. (N. Y. Mallet and Handle Wks.), 40x10x50x
 Tassel and Picture, T. & S. Mfg. Co., 40x10x50x
 Wrought Staples Hooks, &c., 40x10x50x
 See Wrought Goods

Wire

Wire Coat and Hat, Gem, list April, 1886, 60x10x50x
 Wire Coat and Hat, Miles, list April, 1886, 60x10x50x
 Indestructible Coat and Hat, 45x45x25
 Wire Coat and Hat, Standard, 60x10x50x
 Handy Hat and Coat, 50x10x50x
 Steady Ceiling Hooks, 50x10x50x
 Belt, 50x10x50x
 Atlas, Coat and Hat, 60x10x50x
 Williams' Patent, 60x10x50x
 April, 1892, 40x
 Bright Wire Goods—See Wire.

Miscellaneous

Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25
 Nollin's Grass, 40x10x50x
 Bush, 40x10x50x
 Whittey's Patent, 40x10x50x
 Hooks and Eyes—Malleable Iron, 70x10x50x
 Hooks and Eyes—Brass, 60x10x50x
 Fish Hooks, American, 60x10x50x
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes

See Shoes, Horse.

Hose, Rubber

Competition, Fair quality, 75x75x10x
 Competition, Low Grade, 80x80x10x
 Standard, 70x10x70x10x
 N. Y. B. & P. Co., Para., 25x25
 N. Y. B. & P. Co., Extra, 40x40x50x
 N. Y. B. & P. Co., Dundee, 60x60x50x
 Cotton Garden, 3 in. coupled, 75
 Fair Quality, 75
 Good Quality, 75

Huskers

Blair's Adjustable, 40x10x50x
 Blair's Adjustable Clipper, 40x10x50x
 Hubbard's Solid Steel, 40x10x50x

Indurated Fiber Ware

See Ware, Indurated Fiber.

Irons

From 4 to 10, at factory, 100 lb., \$2.30
 Self-Heating, 40x10x50x
 Sensible, list Jan. 91, 40x10x50x
 Mrs. Potts' Sad Irons, per set, 50
 Small tools, 50
 Iron Improved, 50
 Ideal Irons, new list, 50x10x50x10x
 Salamander Irons, 25x
 B. B. & S. Co., 40x10x50x
 Chinese Laundry (N.E. Butt Co.), 50x10x50x
 New England, 50x10x50x
 Mahony's Troy Pol. Irons, 25x
 Sensible, list Jan. 91, 40x10x50x
 Sensible Tailor's Irons, 33x
 National Self-Heating, 30x

Soldering

Soldering Coppers, 40x10x50x
 Cover's Adjustable, list Jan. 1, 1886, 50x25
 Tinker's Dred, 40x10x50x

Pinking

Pinking Irons, 40x10x50x

Jack Screws—See Screws.

Jacks, Wagon

Dain, 33x45
 Victor, 33x45
 Lockport, 40x

Kettles

Brass, Spun, Plain, list Jan. 1, '91, 25x25
 Ames' Butcher Knives, 40x10x50x
 Hotchkiss' Copper and Tinned, 40x
 Hotchkiss' Pad. and Cab., 30x
 Wellensack Tinned, 60x10x50x

Knife Sharpeners

See Sharpeners, Knife.

Knives

Wilson's Butcher Knives, list Dec. 8, 1890, 25x
 Ames' Butcher Knives, 40x10x50x
 Foster Bros' Butcher, &c., 40x
 Jordan's A.A. Butchers', list, net
 Nicholson's Wagon Knives, 40x10x50x
 W. V. Wilson, Butcher, 3 in., \$2.00; 7 in., \$2.70; 8 in., \$3.30, &c., 20x25
 Ames' Shoe Knives, 40x10x50x
 Ames' Bread Knives, 40x10x50x
 Moran's Shoe and Bread, 20x20x10x
 Hay and Straw—See Hay Knives.
 Table and Pocket—See Cutlery.

Corn

Bradley's, 40x10x50x
 Wadsworth's, 25x25x10x

Drawing

Wetherby, P. S. & W., 75x75x10x25
 Mix, 75x75x10x25
 New Haven, 40x10x50x
 Ames' Drawing, 40x10x50x
 Douglas, 75x75x10x25
 Watrous, 15x10x25x

L & I. J. White

Bradley's, 20x25
 Adjustable Handle, 25x25
 Wilkinson's Folding, 25x25x25x

Hay and Straw

Lightning, from Jobbers, \$8.00x\$9.00
 Wadsworth's, 40x10x50x
 Carter's Needles, 40x10x50x
 Heaths', 40x10x50x
 Nollin's Hay, 40x10x50x

Mincing

Am. (2d quality), 40x10x50x
 2 blades, 12x3 blades, 18x, net
 Lothrop's, 20x10x
 Smith's, 40x10x50x
 Knapp & Cowles, 60x10x50x
 Buffalo Adjustable, 40x10x50x

Knobs

Door, Mineral, 40x10x50x
 Door, Por. Jap'd, 70x75x
 Door, Por. Nickel, 22x60x25x
 Door, Por. Plated Nickel, 22x60x25x
 Drawer, Porcelain, 60x10x50x
 Hemlock Door Knob, 40x10x50x
 Yale & Towne Wood, list Dec. 1888, 40x
 Base, Rubber Tip, 70x10x50x
 Picture, Judd's, 60x10x50x
 Picture, Sargent's, 70x10x50x
 Picture, Hemlock, 35x25x
 Shutter, Porcelain, 65x10x50x
 Carriage, Jap. Wood, 60x10x50x
 Bardley's Wood Door, Shutter, &c., 15x

Ladders

Davies Extension and Single, 20x25

Ladies

Melting, Sargent's, 60x10x50x
 Melting, Reading, 40x10x50x
 Melting, P. S. & W., 35x10x40x
 Melting, Warner's, 40x10x50x

Lanterns

Tubular

Regular, with Guard, 40x10x50x
 O. K., with Guard, 40x10x50x
 Side Lift, with Guard, 40x10x50x
 Square Lift, with Guard, 40x10x50x
 Anti-Friction, with Guard, 40x10x50x
 Brass Plated, Sq. Lift, Guard, 40x10x50x
 Cop. Plated, Sq. Lift, Guard, 40x10x50x

Bull's Eye Police

2 1/2-inch regular, 40x10x50x
 3-inch regular, 40x10x50x
 3 1/2-inch flash light, 40x10x50x
 3-inch flash light, 40x10x50x

Lawn Mowers

See Mowers, Lawn.

Leaders, Cattle

Humason, Beckley & Co.'s, 70x
 Sargent's, 70x10x70x10x10x
 Hotchkiss, 30x
 Peck, Stow & W. Co., 60x10x50x

Lemon Squeezers

See Squeezers, Lemon.

Lifters, Transom

Pruning Shears and Hooks

Diston's Combined Pruning Hook
 and Saw..... $\frac{1}{2}$ doz. \$18.00, 20 $\frac{1}{2}$ doz.
 Diston's Pruning Hook, $\frac{1}{2}$ doz. \$12.00
 20 $\frac{1}{2}$ doz.
 E.S. Lee & Co.'s Pruning Tools, 50 & 10 doz. 70 $\frac{1}{2}$
 Pruning Shears, Henry's Pat. $\frac{1}{2}$ doz.

Henry's Pruning Shears, 7 doz. \$4.2

Wheeler, M. & C. Co., Combination	\$24.00
Doan's Saw and Chisel, W does	\$12.00
J. Mallinson & Co., No. 1. 5525. No. 2. 87	\$5.00
P. S. & W. Co.	00%
Levin Pruner No. 1. \$15.00 W does	40%
Levin Pruner No. 2. 1000	40%
Tinners', &c.	
Shears and Snips (P. S. & W.)	\$26.25
Snips, J. Mallinson & Co.	\$3.00
Sheaves—	
Sliding Door—	
M. W. Co., list Dec. 1888.	50%10 60250
R. & E., list Dec. 14, 1888.	50%25
Corbin's list	60%10 6025
Patent Roller, Harwood's	60%10 6025
Russell's Anti-Friction, list Dec. 18	60%
Moore's Anti-Friction	60%25
Sliding Shuttle—	
R. & E., list Dec. 18, 1888.	60%10 6025
Sargent's list	70%
Ross's	60%10 6025
Shells—	

First quality

First quality Rival, Club and Climax
brands, 14, 16 and 20 gauge (\$7.50
list)..... 20 1/2 10 1/2 2 1/2

Star, Club, Rf

Smokeless brand, 12, 10, 16 gauge. 80% & 100%
Trap brand, 12 and 10 gauge. 80% & 100%
Seibold's Comb. Shot Shell 150's 150's
Brass Shot Shells, 1st quality 90%
Brass Shot Shells, Club, Royal, Climax 65%
Shells. Loaded—
Standard List, July 19, 1900.
40% & 100% 40% & 100%
7% cash, 10 days.
Ship Tools—
L. & L. J. White 20%
25%

Shoes, 1

Burden's, Perkins', Phoenix, Standard,
Diamond State, Bryden's Boss and
Crescent, at factory..... \$4.00
Bryden's Frog Pressure, at factory..\$5.00
Mule-

Add 51 7 keg

Tom lots.....	7 10 9¢
1000 # lots.....	7 10 9¢
500 # lots.....	7 10 10¢
Shot—	
	Small lots.

Drop, up to B,
Drop, up to B,
Drop, B and

Drop, 3 and larger, 50-s	1.70	
Drop, 3 and larger, 5-s	.40	
Buck and Chilled, 35-s	.40	
Buck and Chilled, 5-s bag	1.70	
Dust Shot, 25-s bag	2.00	
Dust Shot 5-s bag	.48	
		In ton lots a count of 56 (25 lb) in bags for 50
Shovels and Spades		
Ames' Shovels, Spades, &c., list Nov. 1, 1885.		

NOTE—Jobs extra on above Griffiths Block

Griffin's Black Iron.....	50¢10%
Griffin's C. S.....	60¢60½%
Griffin's Solid C. S. R. R. Goods.....	20%
St. Louis Shovel Co.....	20¢20 & 7½%
Hussey, Bissell & Co.....	15¢25%
Hubbard & Co.....	20¢20 & 7½%
Lehigh Mfg. Co.....	50¢10%
H. M. Myers Co.....	30%

Payne Pettebo
Remington's (

Rowland's Black Iron..... 50¢10 50¢10 50¢10 50¢10
Rowland's Steel..... 50¢10 50¢10 50¢10 50¢10
Terra Haute Shovel &..... 25¢
Shovels and Tongs—
Iron Head..... 50¢10 50¢10 50¢10 50¢10
Brass Head..... 50¢10 50¢10 50¢10 50¢10
Sieves and Sifters—
Mann's Tin Rim..... 50¢25¢

Shaker (Barlen

Electric Light..	7	dos \$1.50;	7	gr \$15.00
A. & W. Sifters.....	7	gr \$15.00		
Hunter's Genuine.....	7	dos \$1.75;	7	gr \$15.00
Hunter's Imitation.....	7	dos \$1.75;	7	gr \$15.00
Sieves, Wooden Rim				
Mesh 18, Nested.....	7	dos.....	Iron	Plated
Mesh 20, Nested.....	7	dos.....	.95	1.10

Sinks. V

Columbus, Painted or Unpainted.....	34¢	810¢
Columbus, Galvanized and Enamelled.....	50¢	810¢
New Era, Painted.....	40¢	50¢
New Era Galvanized and Enamelled.....	60¢	70¢
Skels, Thimble		
Western list.....	71¢	75¢
Columbus, Cast Steel, Special net prices		
Columbkiddie Iron Co.....	60¢	
Seneca Falls Pattern.....	60¢	
Utica P. & T. Skels.....	60¢	
Utica Turned and Fitted.....	35¢	
Slates—		

Large lots.

Slaw Cutters—See Cutters.
Sledge Hammer
 Tubular Steel . . . $\frac{1}{2}$ doz. \$24.00, 40&50%

Twino

No. 9,	and	3	Balls....	25	31
No. 12,	and	3	Balls....	22	30
No. 13,	and	3	Balls....	20	28
No. 34,	and	3	Balls....	20	28
No. 36,	and	3	Balls....	18	26
No. 264 Mattress,	1	and	1	Balls, 32	34
Chalk Line, Cotton,	1	3	Balls		35
Woolen Line, Linen,	1	3	Balls		35
2-PLY Hemp,	1	and	1	3	Balls (Spring
Twine)					15
3-PLY Hemp, 1	3	Balls		16	18
3-PLY Hemp, 1	3	Balls		15	18

2, 3, 4 and 5 F
Wool

Wool.....8.00
Paper.....13.00
Cotton Mops, 6, 9, 12 and 15 in to doz. 18.00

**Wises—
Solid Box...**

Parallel—	
Fisher & Norris Double Screw...	154.10%
Stephens'.....	254.30%
Parker's.....	204.25%
Wilson's.....	554.00%

Howard's....
Bonney's....
Millers' Falls

Trenton.....	40	50	40	10
Merrill's.....		15	20	
Holland's.....		35	40	

Sargent's....
Backus and U
Double Flower

Double Screw Log.....	15¢ 10
Prentiss.....	20¢ 25
Simpson's Adjustable.....	40
Moore's.....	20
Massey Quick Action.....	20¢ 25

Cam Filings

Bonney's, No.

Stearns' Silent Saw Vics.	3.49	85
Hopkins'	7	dos \$17.50, 107
Reading	40	40
Wentworth	20	20
Economy, 7 dos; Nos. 110, 110.00; 190		

\$15.00.....
Mile

Phoenix Vises.....	2 doz	\$3.00	\$3.00
Phoenix Hand Vises....	2 doz	\$3.00	\$3.00
Cowell Hand Vises.....	2 doz	\$3.00	\$3.00
Bauer's Pipe Vises.....	2 doz	\$3.00	\$3.00
Cincinnati.....	2 doz	\$3.00	\$3.00

Enterprise P
Massey Comb

Wads—Price Per M.	
U.M.C.&W.R.A.—B. E., 11 up.	68¢
U.M.C.&W.R.A.—B. E., 9&10.	82¢
U.M.C.&W.R.A.—B. E., 8.....	96¢
U.M.C.&W.R.A.—B. E., 7.....	\$1.10

U.M.C.&W.R.
U.M.C.&W.R.

U.M.C.&W.R.A.—P. E., 8.....	1.70	5
U.M.C.&W.R.A.—P. E., 7.....	1.80	5
Eley's B. E., 11 and larger...	\$1.70	17
Eley's P. E., 12 to 20.....	\$3.00	22

Wagon Boxes—

See Box
Wagon

Wagon Jacks—
See Jacks, Wagon.
Ware, Hollow—
Cast Iron, Hollow—
Stove Hollow-Ware—

**Ground ...
Unground..**

White Enameled Ware—	
Maalin Kettles.....	70¢ & 1.00 & 70¢
Boilers and Saucepans.....	80¢ & 60¢ & 50¢
Tinned Boilers and S'pans....	40¢ & 60¢ & 50¢
Rustless Hollow Ware.....	50¢ & 50¢ & 50¢
Gray Enameled Ware—	

Stove.....
Maslin Kett

Boilers and Saucepans..... 40¢
Enameled—
 Agate and Granite Ware, } Extra 10¢
 List Jan. 1, 1889..... 33¢ } on some
 Ironclad Enameled } leading

Ware.....

Galvanised Tea-Kettles—			
Inch.....	6	7	
Each....	55¢	60¢	
		8	9
		65¢	75¢
Standard Fiber			
		Per Dos.	

Wash-Basins, Toilet Basins

Wash-Basins, 12 in.....	2.00	2.00
Keelers, 11½ in.....		3.50
Cuspidors.....		7.50
Spittoons, "Daisy," 8 in.	3.50	4.00
Peck Measure.....	2.50	
Half-Peck Measure.....	2.00	

See also *Pal*
Indura

Spittoons No. 2, 4 doz.	\$5.00
Basins, Ringed, 4 doz. No. 2	7.80
Washtubs, Nested, Nos. 0, 1, 2, and 3 (4 pieces), 4 nest.	\$5.75
Keelers Nested, Nos. 1, 2, 3 and	4.45

pieces), 4 1/2
Butter Bowls
pieces) 11 1/2

Liquid Measures, pt., qt., 2 qt. and
funnell (4 pieces), $\frac{1}{2}$ set..... \$1.30
See also Pails.
Silver Plated, Hollow
4 mo. or 5 g cash in 30 day

Reed & Barton
Meriden Brit

Simpson, Hall, Miller & Co....
Rogers & Brother.....
Hartford Silver Plate Co.... } 404545
William Rogers Mfg. Co.... }
Washers—
512 24 14 50018

Washers....
In lots less th

Washer Cutters—
See *Cutters, Washers.*

Wedge

Iron.....	\$ 2.34
Steel.....	
Weights, Sash—	
Solid Eye.....	\$ ton, \$15.00@19.00
Well Buckets Galvan	
12-in. Dia Buckets.....	Well Gal

vanized.

Original from

Original from
UNIVERSITY OF CALIFORNIA

